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Revision 3B

UC-630, 721

# 300 Area Solvent Evaporator Closure Plan

Date Published  
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ATTACHMENT 16 TO THE DANGEROUS WASTE  
PORTION OF THE RESOURCE CONSERVATION AND  
RECOVERY ACT PERMIT FOR THE TREATMENT,  
STORAGE AND DISPOSAL OF DANGEROUS WASTE



United States  
Department of Energy

P.O. Box 550  
Richland, Washington 99352

Approved for Public Release

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ENCLOSURE 3

STATE ENVIRONMENTAL POLICY ACT (SEPA)

ENVIRONMENTAL CHECKLIST FORMS

REVISION 2

FOR

300 AREA SOLVENT EVAPORATOR

CLOSURE PLAN

REVISION 3

WASHINGTON ADMINISTRATIVE CODE  
ENVIRONMENTAL CHECKLIST FORMS  
[WAC 197-11-960]

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SEPA ENVIRONMENTAL CHECKLIST (Rev. 2)  
FOR  
THE 300 AREA SOLVENT EVAPORATOR  
CLOSURE PLAN (Rev. 3)

A. BACKGROUND

1. Name of proposed project, if applicable:

Closure of the 300 Area Solvent Evaporator (300 ASE) site.

Information contained in this checklist applies only to the 300 Area Solvent Evaporator site. Additional environmental information regarding the Hanford Site can be found in the environmental documents referenced in the answer to checklist question A.8.

2. Names of applicants:

U.S. Department of Energy-Richland Operations Office (DOE-RL) and  
Westinghouse Hanford Company (WHC)

3. Address and phone number of applicants and contact persons:

U.S. Department of Energy	Westinghouse Hanford Company
Richland Operations Office	P.O. Box 1970
P.O. Box 550	Richland, Washington 99352
Richland, Washington 99352	

Contact persons:

R. D. Izatt, Director	R. E. Lerch, Manager
Environmental Restoration Division	Environmental Division
(509) 376-5441	(509) 376-5556

4. Date checklist prepared:

February 27, 1990

5. Agency requesting checklist:

State of Washington  
Department of Ecology  
Mail Stop PV-11  
Olympia, Washington 98504-8711

6. Proposed timing or schedule (including phasing, if applicable):

Initial closure activities have been completed. All waste remaining in the 300 ASE was solidified and removed to a treatment, storage, and/or disposal (TSD) facility. The solvent evaporator tank was sectioned and also removed to a TSD facility. Upon approval of the 300 ASE Closure Plan, it is anticipated that final closure will be completed within 180 days.

7. Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.

The closure activities that remain to be performed include soil and concrete sampling to verify absence of soil and concrete contamination originating from the 300 ASE. If clean closure is not practical, final disposition of the site will be determined through the Remedial Investigation and Feasibility Study (RI/FS) process in conjunction with the 300 Aggregate Area Operable Unit (300-FF-2).

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

This revised SEPA Checklist is being submitted to the Washington State Department of Ecology (Ecology) concurrently with revision 3 of the Closure Plan for the 300 ASE. A Memorandum-to-File and an Environmental Evaluation similar to this SEPA Checklist may be prepared for DOE-RL and WHC internal documentation purposes. A RI/FS is planned for the 300-FF-2 Operable Unit.

Additional environmental information regarding the Hanford Site can be found in the following documents:

*Final Environmental Impact Statement - Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes, DOE/EIS-0113, Volumes 1 through 5, 1987, U. S. Department of Energy, Washington, D.C.*

*Draft Environmental Impact Statement - Decommissioning of Eight Surplus Reactors Production Reactors at the Hanford Site, Richland Washington, DOE/EIS-0119D, 1989, U. S. Department of Energy, Washington, D.C.*

*Hanford Site National Environmental Policy Act (NEPA) Characterization, C. E. Cushing, PNL-6415, Rev. 1, 1987, UC-11, Pacific Northwest Laboratory, Richland, Washington.*

9. Do you know whether applications are pending for government approvals of other proposals directly affecting property covered by your proposal?

No.

10. List any government approvals or permits that will be needed for your proposal, if known.

Ecology is the lead agency authorized to approve the closure plan for the 300 ASE site under requirements authorized by the Resource Conservation and Recovery Act (RCRA), and Chapter 173-303-400 of the Washington Administrative Code. No other permits are known to be required at this time.

11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

This project proposes a clean closure strategy for final closure of the 300 ASE. Clean closure is contingent on the verification that soil and concrete contamination originating from the 300 ASE is below established clean-up levels. Soil and concrete samples will be collected and analyzed to assess contamination.

The solvent evaporator closure site is located in the northeast corner of the 300 Area of the Hanford Site. The evaporator operated as a treatment tank facility for solvent wastes from nearby reactor fuel manufacturing facilities from 1975 to 1985. All waste remaining in the 300 ASE was solidified and removed to a TSD facility. The solvent evaporator tank was sectioned and also removed to a TSD facility. The remaining closure site is a section of soil (approximately 500 square feet) and a portion of the 333 East Concrete Pad (approximately 2200 square feet) that encompassed the location of the 300 ASE during its 10-year operating period.

Underlying the 300 ASE site is an inactive low-level radioactive waste burial ground (618-1). This burial ground is one of a group of sites within the 300 Area collectively referred to as the 300 Operable Unit 300-FF-2. The 300 Aggregate Area Operable Units (including Operable Unit 300-FF-2) have been included on the National Priorities List (NPL) of federal facilities requiring remedial action and regulation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

1 The facility is located in T10N, R28E, Section 11 in the northeast  
2 corner of the 300 Area of the Hanford Site. Maps and detailed location  
3 plans are contained in the closure plan submitted with this checklist.  
4  
5  
6

7 B. ENVIRONMENTAL ELEMENTS  
8

9 1. Earth  
10

11 a. General description of the site: Flat, rolling, hilly, steep  
12 slopes, mountainous, other.

13 Flat.  
14  
15  
16

17 b. What is the steepest slope on the site (approximate percent slope)?  
18

19 The approximate slope of the land at the facility is less than two  
20 percent.  
21

22 c. What general types of soil are found on the site (for example,  
23 clay, sand, gravel, peat, muck)? If you know the classification of  
24 agricultural soils, specify them and note any prime farmland.  
25

26 The soil found at the 300 ASE site is fill material consisting of a  
27 gravelly sand with cobbles. No farming is permitted on the site.  
28  
29

30 d. Are there surface indications or history of unstable soils in the  
31 immediate vicinity? If so, describe.  
32

33 No.  
34  
35  
36

37 e. Describe the purpose, type, and approximate quantities of any  
38 filling or grading proposed. Indicate the source of the fill.  
39

40 None at this time.  
41  
42

43 f. Could erosion occur as a result of clearing, construction, or use?  
44 If so, describe.

45 Due to the flat topography, dry climate, and soil type present at  
46 the site, erosion is not expected.  
47  
48  
49  
50  
51  
52

9413293.1937



- 1 g. About what percentage of the site will be covered with impervious  
2 surfaces after project construction (for example, asphalt or  
3 buildings)?

4  
5 None at this time.  
6

- 7  
8 h. Proposed measures to reduce or control erosion, or other impacts to  
9 the earth, if any:

10  
11 None at this time.  
12  
13

14  
15 2. Air

- 16 a. What types of emissions to the air would result from the proposal  
17 (i.e., dust, automobile, odors, industrial wood smoke) during  
18 construction and when the project is completed? If any, generally  
19 describe and give approximate quantities if known.

20  
21 Minor amounts of dust may be generated from the drill which is used  
22 for concrete sampling. Air misting will be used to control airborne  
23 discharges during concrete drilling.  
24

- 25 b. Are there any offsite sources of emissions or odors that may affect  
26 your proposal? If so, generally describe.

27  
28 No.  
29

- 30  
31 c. Proposed measures to reduce or control emissions or other impacts to  
32 the air, if any:

33  
34 None at this time.  
35  
36

37  
38 3. Water

39  
40 a. Surface

- 41  
42 1) Is there any surface water body in or in the immediate vicinity  
43 of the site (including year-round and seasonal streams,  
44 saltwater, lakes, ponds, wetlands)? If yes, describe type and  
45 provide names. If appropriate, state what stream or river it  
46 flows into.

47  
48 No. The closest body of surface water is the Columbia River,  
49 which is approximately one-third of a mile from the 300 ASE.  
50  
51  
52  
53

- 1 2) Will the project require any work over, in, or adjacent to  
2 (within 200 feet of) the described waters? If yes, please  
3 describe and attach available plans.  
4

5 No.  
6  
7

- 8 3) Estimate the amount of fill and dredge material that would be  
9 placed in or removed from surface water or wetlands and indicate  
10 the area that would be affected. Indicate the source of the  
11 fill.  
12

13 None.  
14

- 15 4) Will the proposal require surface water withdrawals or  
16 diversions? Give general description, purpose, and approximate  
17 quantities if known.  
18

19 No.  
20  
21

- 22 5) Does the proposal lie within a 100-year floodplain? If so, note  
23 location on the site plan.  
24

25 No.  
26  
27

- 28 6) Does the proposal involve any discharges of waste material to  
29 surface waters? If so, describe the type of waste and  
30 anticipated volume of discharge.  
31

32 No.  
33  
34

35 b. Ground  
36

- 37 1) Will groundwater be withdrawn, or will water be discharged to  
38 groundwater? Give general description, purpose, and approximate  
39 quantities if known.  
40

41 No.  
42  
43

- 44 2) Describe waste materials that will be discharged into the ground  
45 from septic waste tanks or other sources, if any (for example:  
46 Domestic sewage; industrial, containing the following  
47 chemicals...; agricultural; etc.). Describe the general size of  
48 the system, the number of such systems, the number of houses to  
49 be served (if applicable), or the number of animals or humans  
50 the system(s) are expected to serve.  
51

52 Does not apply.  
53

c. Water Run-off (including storm water):

- 1) Describe the source of run-off (including storm water) and methods of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other wastes? If so, describe.

Does not apply.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

No.

d. Proposed measures to reduce or control surface, ground, and run-off water impacts, if any:

Does not apply.

4. Plants

a. Check the types of vegetation found on the site:

- ☐ deciduous trees: alder, maple, aspen, other  
☐ evergreen trees: fir, cedar, pine, other  
☐ shrubs  
☐ grass  
☐ pasture  
☐ crop or grain  
☐ wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other  
☐ water plants: water lily, eelgrass, milfoil, other  
☐ other types of vegetation

None.

b. What kind and amount of vegetation will be removed or altered?

None.

c. List threatened or endangered species known to be on or near the site.

None on the 300 ASE site. However, additional information concerning endangered and threatened plants on the Hanford Site can be found in the environmental documents referenced in the answer to checklist question A8.

1 be found in the environmental documents referenced in the answer to  
2 checklist question A8.

- 3 d. Proposed landscaping, use of native plants, or other measures to  
4 preserve or enhance vegetation on the site, if any.

5  
6 None.

7  
8  
9 5. Animals

- 10  
11 a. Circle any birds and animals which have been observed on or near  
12 the site or are known to be on or near the site:

13  
14 birds: hawk, heron, eagle, songbirds, other

15  
16 mammals: deer, bear, elk, beaver, other

17 fish: bass, salmon, trout, herring, shellfish, other

18  
19  
20 Starlings, lagomorphs, and pigeons have been observed on the site.  
21 Additional information on birds and animals found on the Hanford  
22 Site can be found in the environmental documents referenced in the  
23 answer to checklist question A8.

- 24  
25  
26 b. List any threatened or endangered species known to be on or near  
27 the site.

28  
29 The 300 ASE site is not known to be used by any threatened or  
30 endangered species. Additional information concerning endangered  
31 and threatened animals on the Hanford Site can be found in the  
32 environmental documents referenced in the answer to checklist  
33 question A8.

- 34  
35  
36 c. Is the site part of a migration route? If so, explain.

37  
38 No, the site is not used by animals for migration. However, the  
39 adjacent Columbia River is considered an important resting place  
40 for Pacific flyway waterfowl and shore birds during the autumn  
41 migration. Additional information on the Hanford Site environment  
42 can be found in the environmental documents referenced in the  
43 answer to checklist question A8.

- 44  
45  
46 d. Proposed measures to preserve or enhance wildlife, if any:

47  
48 None.

49  
50  
51  
52 6. Energy and Natural Resources  
53

- 1 a. What kinds of energy (electric, natural gas, oil, wood stove,  
2 solar) will be used to meet the completed project's energy needs?  
3 Describe whether it will be used for heating, manufacturing, etc.  
4

5 None.  
6  
7

- 8 b. Would your project affect the potential use of solar energy by  
9 adjacent properties? If so, generally describe.  
10

11 No.  
12

- 13 c. What kinds of energy conservation features are included in the  
14 plans of this proposal? List other proposed measures to reduce or  
15 control energy impacts, if any:  
16

17 Does not apply.  
18  
19

20 7. Environmental Health  
21

- 22 a. Are there any environmental health hazards, including exposure to  
23 toxic chemicals, risk of fire and explosion, spill, or hazardous  
24 waste, that could occur as a result of this proposal? If so,  
25 describe.  
26

27 Environmental health hazards are not expected. However, the  
28 potential for exposure to hazardous chemicals exists during the  
29 soil sampling effort. Procedures to prevent and manage hazards are  
30 presented in the closure plan.  
31

- 32 1) Describe special emergency services that might be required.  
33

34 In the event of an unexpected emergency, fire, ambulance, and  
35 patrol assistance may be required. These services are  
36 available on the Hanford Site.  
37

- 38  
39 2) Proposed measures to reduce or control environmental health  
40 hazards, if any:  
41

42 No environmental health hazards are expected. Procedures to  
43 prevent and manage potential hazards are presented in the  
44 closure plan.  
45

46  
47 b. Noise  
48

- 49 1) What type of noise exists in the area which may affect your  
50 project (for example: traffic, equipment, operation, other)?  
51

52 None.  
53

- 1  
2  
3  
4 2) What types and levels of noise would be created by or  
5 associated with the project on a short-term or a long-term  
6 basis (for example: traffic, construction, operation, other)?  
7 Indicate what hours noise would come from the site.

8 A minor short-term increase in noise, may result from the  
9 air drill which is used for concrete sampling.

- 10  
11 3) Proposed measures to reduce or control noise impacts, if any:

12 None.

13  
14  
15 8. Land and Shoreline Use

- 16  
17 a. What is the current use of the site and adjacent properties?

18 The 300 ASE site is part of the Hanford Site, which contains many  
19 facilities for waste management and special nuclear material  
20 production. When the evaporator was active (1975-1985), it  
21 provided treatment by evaporation for spent solvents generated at  
22 Hanford. All waste remaining at the site has been removed to a TSD  
23 facility. No waste management activity is currently ongoing on the  
24 300 ASE site. Completely underlying the 300 ASE site is an  
25 inactive solid radioactive waste burial ground. The 618-1 Burial  
26 Ground was in service from 1945 to 1957 and contains uranium,  
27 plutonium, and fission products from the 300 Area fuel manufac-  
28 turing facilities and incidental waste from 300 Area laboratories  
29 which were in operation at that time. Adjacent to the 300 ASE site  
30 is an active concrete pad for materials and equipment storage.

- 31  
32  
33  
34 b. Has the site been used for agriculture? If so, describe.

35 The 300 ASE site has not been used for agricultural purposes since  
36 1943.

- 37  
38  
39  
40 c. Describe any structures on the site.

41 Does not apply.

- 42  
43  
44  
45 d. Will any structures be demolished? If so, what?

46 No.

- 47  
48  
49  
50 e. What is the current zoning classification of the site?

51 The 300 ASE site possesses the zoning classification of  
52 Unclassified Use by Benton County.  
53

1  
2  
3  
4 f. What is the current comprehensive plan designation of the site?

5  
6 The 1985 Benton County Comprehensive Land Use Plan designates the  
7 Hanford Site as the "Hanford Reservation". Under this designation,  
8 land on the Site may be used for "activities nuclear in nature".  
9 Non-nuclear activities are authorized "if and when DOE approval for  
10 such activities is obtained".  
11

12  
13 g. If applicable, what is the current master shoreline program  
14 designation of the site?

15 Does not apply.  
16

17  
18 h. Has any part of the site been classified as an "environmentally  
19 sensitive" area? If so, specify.  
20

21 No.  
22  
23

24  
25 i. Approximately how many people would reside or work in the completed  
26 project?  
27

28 None.  
29  
30

31 j. Approximately how many people would the completed project displace?  
32

33 None.  
34  
35

36 k. Proposed measures to avoid or reduce displacement impacts, if any:  
37

38 Does not apply.  
39  
40

41 l. Proposed measures to ensure the proposal is compatible with  
42 existing and projected land uses and plans, if any:  
43

44 Does not apply.  
45

46  
47 9. Housing  
48

49 a. Approximately how many units would be provided, if any? Indicate  
50 whether high, middle, or low-income housing.  
51

52 None.  
53

- b. Approximately how many units, if any, would be eliminated?  
Indicate whether high, middle, or low-income housing.

None.

- c. Proposed measures to reduce or control housing impacts, if any:

Does not apply.

#### 10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Does not apply.

- b. What views in the immediate vicinity would be altered or obstructed?

None.

- c. Proposed measures to reduce or control aesthetic impacts, if any:

-----Does not apply.

#### 11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of the day would it mainly occur?

None.

- b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

- c. What existing offsite sources of light and glare may affect your proposal?

None.

9473293.1945



- 1  
2  
3  
4 d. Proposed measures to reduce or control light and glare impacts, if  
5 any:

6  
7 Does not apply.  
8  
9

10 12. Recreation

- 11  
12 a. What designated and informal recreational opportunities are in the  
13 immediate vicinity?

14 None.  
15  
16

- 17 b. Would the proposed project displace any existing recreational uses?  
18 If so, describe.

19 Does not apply.  
20  
21

- 22 c. Proposed measures to reduce or control impacts on recreation,  
23 including recreation opportunities to be provided by the project or  
24 applicant, if any:

25 Does not apply.  
26  
27

28 13. Historic and Cultural Preservation

- 29  
30 a. Are there any places or objects listed on, or proposed for,  
31 national, state, or local preservation registers known to be on or  
32 next to the site? If so, generally describe.

33 No part of the 300 ASE is listed on or proposed for inclusion on  
34 preservation registers. Additional information on the Hanford Site  
35 environment can be found in the environmental documents referenced  
36 in the answer to checklist question A8.  
37  
38

- 39 b. Generally describe any landmarks or evidence of historic,  
40 archaeological, scientific, or cultural importance known to be on  
41 or next to the site.

42  
43 There are no known archaeological, historical, or native American  
44 religious sites at the facility. Additional information on the  
45 Hanford Site environment can be found in the environmental  
46 documents referenced in the answer to checklist question A8.  
47  
48

1 c. Proposed measures to reduce or control impacts, if any:

2  
3 Does not apply.  
4  
5

6 14. Transportation  
7

8 a. Identify public streets and highways serving the site, and  
9 describe proposed access to the existing street system. Show on  
10 site plans, if any.

11 Does not apply.  
12  
13

14 b. Is the site currently served by public transit? If not, what is  
15 the approximate distance to the nearest stop?

16 The site is not publicly accessible and, therefore, is not served  
17 by public transit.  
18  
19

20 c. How many parking spaces would the completed project have? How many  
21 would the project eliminate?

22 None.  
23  
24  
25

26 d. Will the proposal require any new roads or streets, or improvements  
27 to existing roads or streets, not including driveways? If so,  
28 generally describe (indicate whether public or private).  
29  
30

31 No.  
32  
33  
34

35 e. Will the project use (or occur in the immediate vicinity of) water,  
36 rail, or air transportation? If so, generally describe.

37 No.  
38  
39  
40

41 f. How many vehicular trips per day would be generated by the  
42 completed project? If known, indicate when peak volumes would  
43 occur.

44 None.  
45  
46  
47

48 g. Proposed measures to reduce or control transportation impacts, if  
49 any:

50 Does not apply.  
51  
52  
53

15. Public Services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No.

- b. Proposed measures to reduce or control direct impacts on public services, if any:

Does not apply.

16. Utilities

- a. List utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

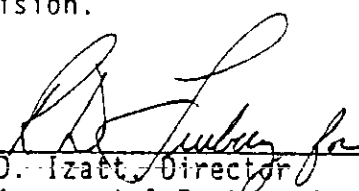
None.

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.


None.

C. SIGNATURES

The above answers are true and complete to the best of our knowledge. We understand that the lead agency is relying on them to make its decision.

  
R. D. Izatt, Director  
Environmental Restoration Division  
U.S. Department of Energy  
Richland Operations Office

3/28/90  
Date

  
R. E. Lerch, Manager  
Environmental Division  
Westinghouse Hanford Company

3/28/90  
Date

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## Page 1

300 Area Solvent Evaporator Closure Plan, Revision 3B

**Date**

F.A. Ruck 03/13/90

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## ACRONYMS

1		
2		
3	300 ASE	300 Area Solvent Evaporator
4		
5	CERCLA	Comprehensive Environmental Response, Compensation, and
6		Liability Act of 1980
7	CFR	Code of Federal Regulations
8	CLP	Contract Laboratory Program
9		
10	DOE	U.S. Department of Energy
11	DOE-RL	U.S. Department of Energy-Richland Operations Office
12		
13	Ecology	Washington State Department of Ecology
14	EII	Westinghouse Hanford Company's
15		Environmental Investigation and Site
16		Characterization Manual (WHC-CM-7-7)
17	EPA	U.S. Environmental Protection Agency
18		
19	FR	Federal Register
20		
21	IRIS	Integrated Risk Information System
22		
23	msl	mean sea level
24		
25	OSHA	Occupational Safety and Health Administration
26		
27	PNL	Pacific Northwest Laboratory
28	PUREX	Plutonium/Uranium Extraction (Plant)
29		
30	QA/QC	Quality assurance/quality control
31		
32	RCRA	Resource Conservation and Recovery Act
33		
34	UNC	United Nuclear Industries
35		
36	WAC	Washington Administrative Code
37	Westinghouse	Westinghouse Hanford Company (WHC)
38	Hanford	
39		
40		

## ABBREVIATIONS

41		
42		
43	DCE	dichloroethylene
44		
45	mg/kg	milligram per kilogram (1 millionth)
46		
47	PCE	perchloroethylene (tetrachloroethylene)
48		
49	ppm	parts per million (1 millionth)
50		
51	TCA	1,1,1-trichloroethane
52		

## ABBREVIATIONS (cont)

1		
2		
3		
4	TCE	trichloroethylene
5		
6	$\mu\text{g/g}$	micrograms per gram (1 millionth)
7		
8	$\mu\text{g/ml}$	microgram per milliliter (1 thousandth)

94-323-1955

## 1.0 INTRODUCTION

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This document describes activities for the closure of a dangerous waste treatment tank facility, owned and operated by the U.S. Department of Energy-Richland Operations Office (DOE-RL) and co-operated by the Westinghouse Hanford Company (Westinghouse Hanford). Although the U.S. Government holds legal title to this facility, the DOE-RL, for the purposes of defining *Resource Conservation and Recovery Act of 1976* (RCRA) (EPA 1982) facilities, is considered the legal owner of the facility under existing U.S. Environmental Protection Agency (EPA) interpretive regulations (51 FR 7722, March 5, 1986). This tank treatment facility is the 300 Area Solvent Evaporator (300 ASE), which was located in the 300 Area of the Hanford Site from 1975 to 1986, and was managed for the DOE-RL by UNC Nuclear Industries, Incorporated. The 300 ASE evaporator unit was a modified load lugger (dumpster) in which solvent wastes were evaporated, and the adjacent 333 East Concrete Pad, where 55-gallon barrels of waste solvents were temporarily stored while awaiting liquid transfers into the evaporator.

From the start of the Hanford Site in the early 1940's until just prior to the use of the 300 Area Process Trenches (March 1975), almost all the spent process chemicals from the 300 Area were discharged to the 300 Area Process Ponds. These ponds received degreaser solvents, waste acids, caustics, and machine sump oils. The only excluded discharges were acid solutions that contained sufficient uranium for economically practical recovery. In 1975, when the 300 Area Process Trenches replaced the 300 Area process ponds, the 300 ASE was utilized so that volatile spent solvents would not be discharged to the 300 Area Process Trenches.

Starting in January or February of 1975, the used degreaser solvents were pumped into steel 55-gallon barrels and stored on the 333 East Concrete Pad until a disposal solution could be found. There was no satisfactory disposal or treatment facility for these degreaser solvents on the Hanford Site in 1975 until the 300 ASE was installed in the spring of 1976. The amount of degreaser solvent that evaporated in the 300 ASE (an average of 600 gallons per year) represents about 17 percent of the total degreaser solvent used. The other 83 percent of the degreaser solvent entered the 333 Building air from the operating degreasers, and was discharged to the atmosphere through doors, vents, and exhaust stacks.

No formal records management system nor records of operations/maintenance, which would have met the requirements of WAC 173-303, were maintained. However, old photographs of the 300 Area have been enlarged to reconstruct the 300 ASE locations.

Some of the 300 ASE solvents were radioactively contaminated because the solvents came from a degreaser, which processed bare uranium metal billets from the N Reactor Fuel Manufacturing facility. The typical 300 ASE waste was composed of perchloroethylene (PCE), trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), ethyl acetate/bromine solution, paint shop solvents, and possibly used oil. Small amounts of uranium and alloys of

1 copper, zirconium, and possibly zirconium/beryllium were also present in the  
2 degreaser solvents as particulates. Although some solvents were not  
3 radioactively contaminated (i.e., originating from the degreasing of  
4 nonradioactive-bearing materials), radioactive and non-radioactive solvents  
5 were intermixed via the storage barrels, and thus, the entire mixture was  
6 regarded as radioactive waste.

7  
8 In 1985, the 300 ASE was phased out and waste solvents were handled in  
9 accordance with the DOE-RL radioactive waste procedures. Shutdown of the  
10 300 ASE began in November 1985 with the solidification of the remaining spent  
11 solvents and proceeded in accordance with UNC Nuclear Industries' procedures  
12 (see Appendix D). By the spring of 1986, the evaporator sludges had been  
13 removed and the steel surfaces thoroughly washed, and cut into pieces for  
14 burial box disposal. Because the 300 ASE treated radioactive wastes, the  
15 onsite low-level radioactive waste burial grounds were designated to receive  
16 the drummed, solidified, cleaning liquids and the dismantled evaporator,  
17 Details of these activities are described in Section 3.2.

18  
19 At the time of physical closure of the 300 ASE, the regulatory authority  
20 for radioactive mixed waste was still being discussed between the EPA and the  
21 U.S. Department of Energy (DOE); therefore, operations at the 300 ASE  
22 proceeded according to existing administrative controls and internal  
23 procedures. The EPA did not issue a clarifying notice on the application of  
24 RCRA to radioactive mixed waste until July 1986, several months after the  
25 evaporator had been dismantled. During the time of operation of the 300 ASE,  
26 the RCRA requirements for temporary storage were not interpreted to apply to  
27 mixed waste. Formal regulatory approvals were not considered to be applicable  
28 prior to the dismantling of the 300 ASE due to uncertainties regarding the  
29 regulation of radioactive mixed waste.

30  
31 After filing the *300 Area Solvent Evaporator Closure Plan*, Revision 0  
32 (November 1985), it was determined that the site lay within the boundary of a  
33 Comprehensive Environmental Response, Compensation, and Liability Act of 1980  
34 (CERCLA) (EPA 1980) inactive radioactive waste burial ground. Subsequently,  
35 the 618-1 Burial Ground has been included in the group of radiologically  
36 contaminated sites at the 300 Area (collectively referred to as the 300 Area  
37 Operable Units) that were used to generate scoring using the Hazardous Ranking  
38 System (HRS) for submission to the EPA as part of the process. The  
39 618-1 Burial Ground lies within Operable Unit 300-FF-2. The juxtaposition of  
40 the 300 ASE closure area and the underlying 618-1 Burial Ground is a  
41 circumstance requiring special considerations for closure of the 300 ASE site  
42 under Washington Administrative Code (WAC) 173-303 *Dangerous Waste Regulations*  
43 (Ecology 1989), EPA regulations (EPA 1989), and for remedial action of the  
44 618-1 Burial Ground under CERCLA.

45  
46 Clean closure under RCRA regulations (WAC 173-303), in accordance with  
47 the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989)  
48 is proposed for the 300 ASE. Justification for this proposal is based upon  
49 the absence of contamination from the 300 ASE as determined by random sampling  
50 of the soil and concrete (Section 3.3 presents sampling plans). The extent of  
51 operation of the 300 ASE and the 618-1 Burial Ground, and the known  
52 characteristics of the wastes associated with them are presented in  
53 Sections 1.1.2 and 1.1.3.

## 1.1 HANFORD SITE AND FACILITY DESCRIPTION

A general description of the Hanford Site as a dangerous waste management facility is discussed in Section 1.1.1. This section is intended to provide the permit application reviewer or permit writer with an overview of the Hanford Site. The descriptions of the 300 ASE and the 618-1 Burial Ground are discussed in Sections 1.1.2 and 1.1.3, respectively.

### 1.1.1 Location and General Description

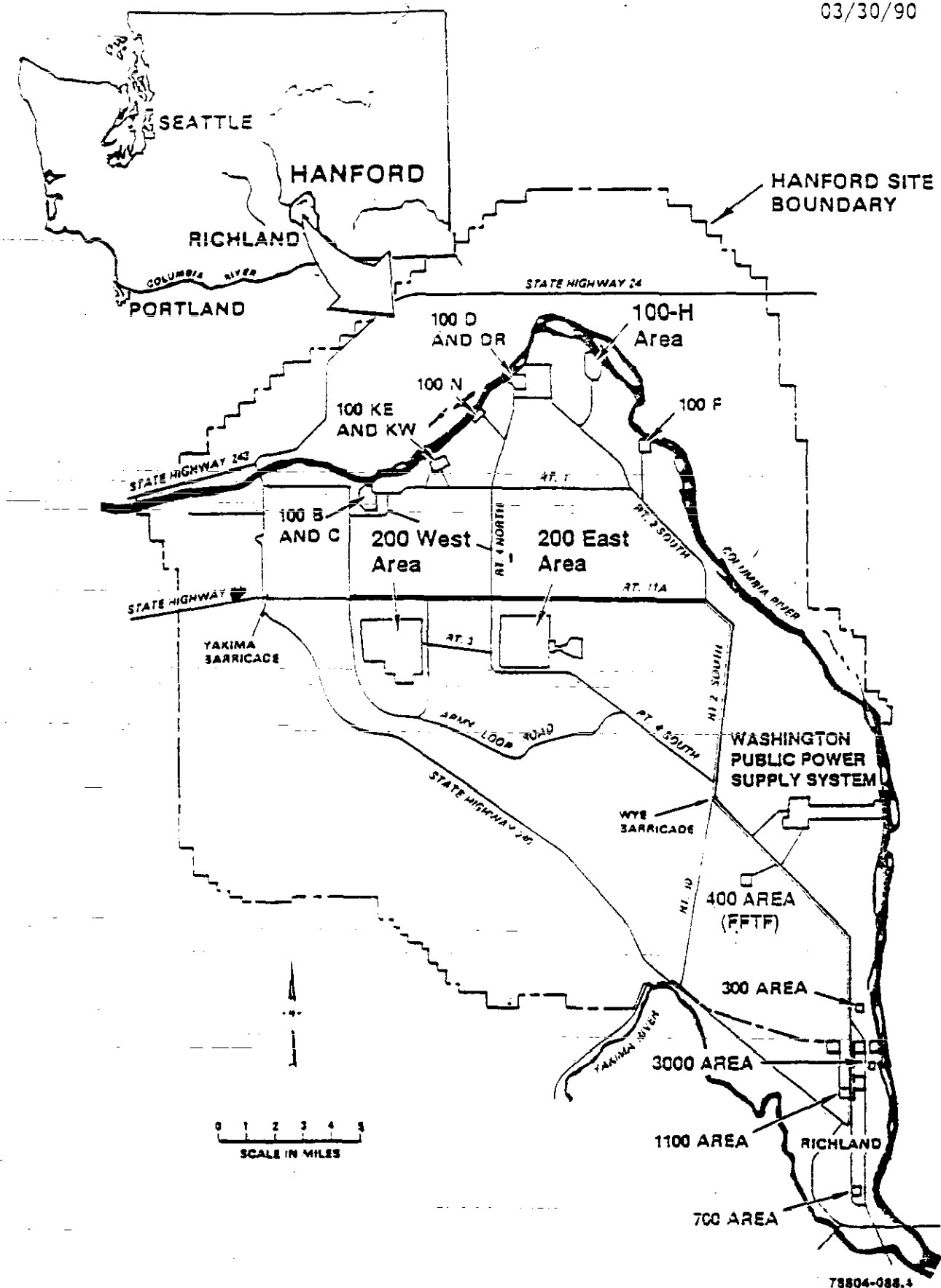
The Hanford Site covers approximately 560 square miles of semiarid land that is owned by the U.S. Government and managed by the DOE-RL. For purposes of RCRA and WAC 173-303, the DOE-RL is the owner/operator and Westinghouse Hanford is the co-operator, with the DOE-RL, of certain hazardous waste management units on the Hanford Site. The Hanford Site is located northwest of the city of Richland, Washington, in the Columbia River Basin (Figure 1-1). The city of Richland lies approximately 5 miles from the southernmost portion of the Hanford Site boundary and is the nearest population center. In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for reactor, chemical separation, and related facilities and activities for the production and purification of plutonium.

Activities at the Hanford Site are separated into numerically designated areas. The reactor facilities (active and deactivated) are located along the Columbia River in what are known as the 100 Areas. The reactor fuel processing and waste management facilities are located in the 200 Areas, which are on a plateau approximately 7 miles from the Columbia River.

The 300 Area, located north of Richland, contains the reactor fuel manufacturing facilities and several research and development laboratories. The 400 Area, 5 miles northwest of the 300 Area, contains the Fast Flux Test Facility used in the testing of liquid metal reactor systems. The 600 Area includes all locations not specifically given an area designation. In north Richland, the 1100 Area contains facilities associated with administration, maintenance, transportation, and materials procurement and distribution. The 3000 Area, between the 1100 and 300 Areas, contains various engineering offices and administrative offices. Administrative offices are also located in the 700 Area in downtown Richland.

### 1.1.2 The 300 Area Solvent Evaporator

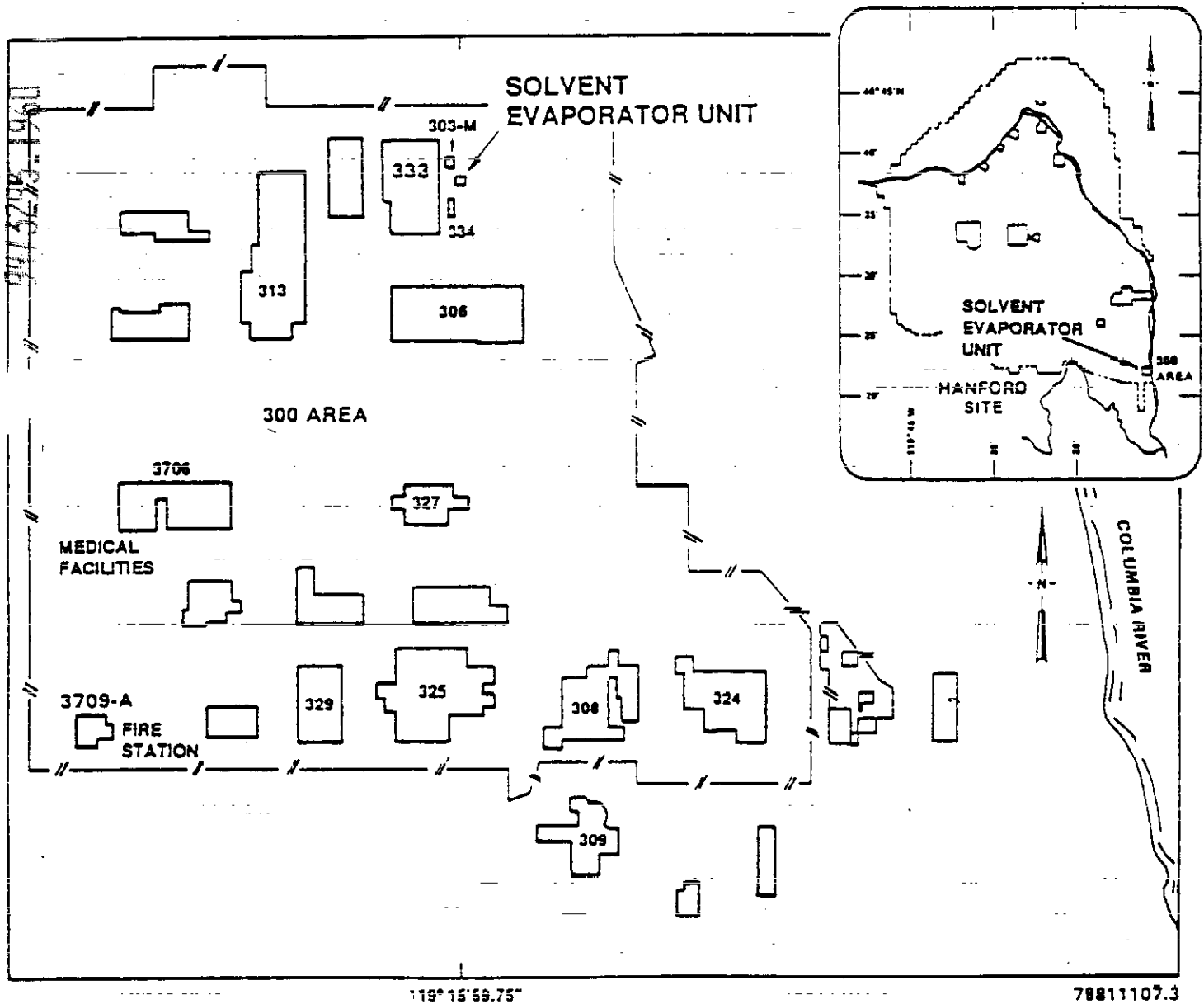
The 300 ASE evaporator unit and associated storage barrels were located in the 300 Area of the Hanford Site from 1975 to 1985, but no longer exists since their demolition in 1985-1986 (see Section 3.2). They were situated in the northeast corner of the 300 Area near the 333 Building, the 334 Building, and the 303-M Building, as shown in Figures 1-2 and 1-3. The site for the 300 ASE was chosen for its proximity to the operations of the N Reactor Fuel Manufacturing facility in the 333 Building. The 300 ASE was a treatment tank (evaporator) which received barrel-transferred solvent wastes from degreasing operations associated with the N Reactor Fuel Manufacturing facility. While



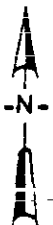
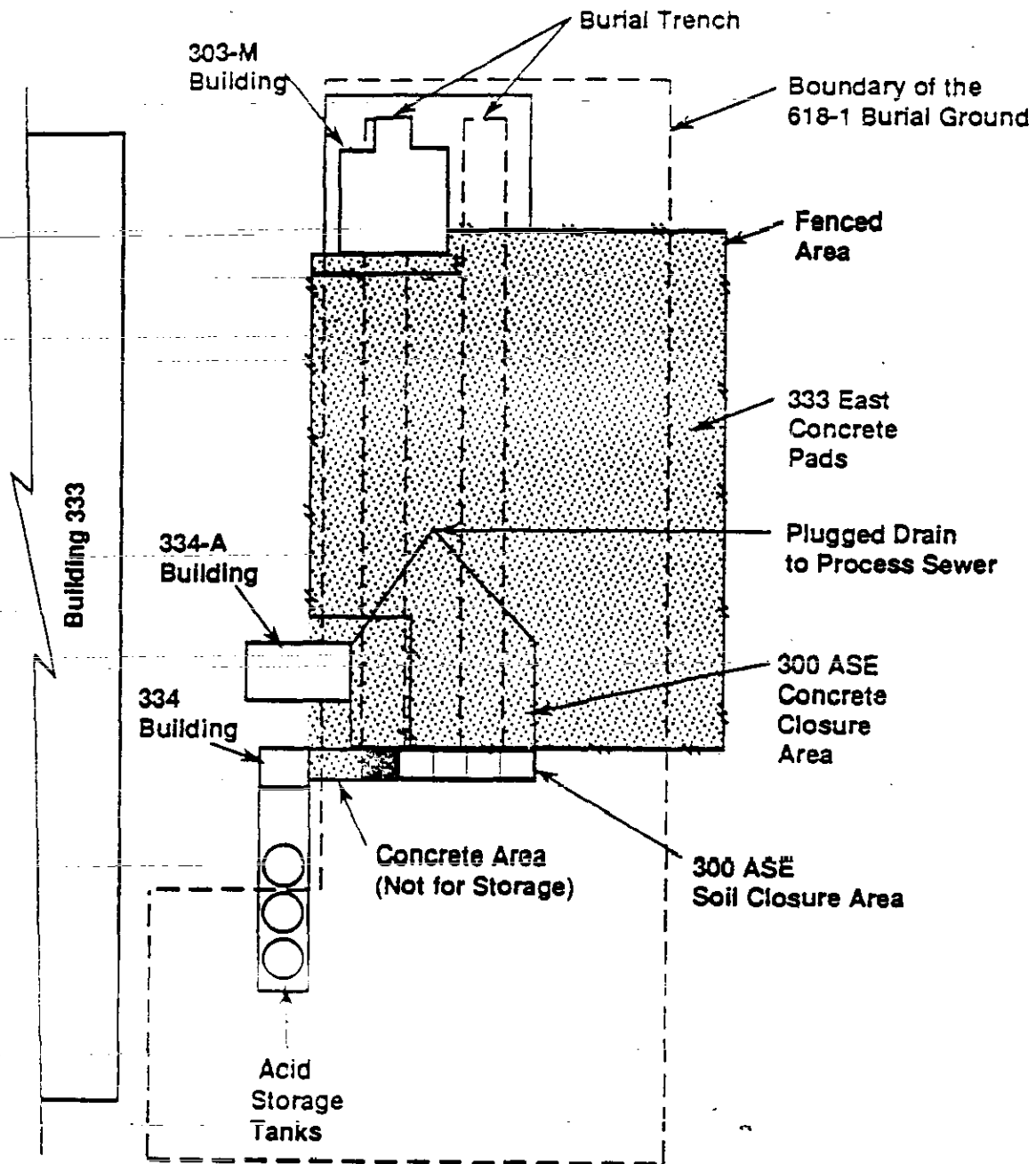
1 Figure 1-1. Hanford Site and Regional Map:



## 300 AREA SOLVENT EVAPORATOR UNIT



1 Figure 1-2. Solvent Evaporator Facility. 300 Area Map.



Last Location of 300 ASE and Spill Site

0 10 20 30 40 50 ft

(2-5-90)  
78911137.4

1 Figure 1-3. Layout of the 300 Area Solvent Evaporator Closure Areas  
2 and 618-1 Burial Ground.

awaiting transfers, the solvent waste barrels were typically stored adjacent to the evaporator.

The evaporator was a modified 'Brooks' load lugger; i.e., dumpster, constructed of carbon steel with a hinged aluminum sheet metal canopy over the top. The canopy (added in 1978) prevented entry of precipitation while allowing airflow across the top of the solvent, and allowed one end to be lifted for pouring the contents of solvent barrels into the north-facing cutout side of the evaporator. Dimensionally, the 300 ASE was about 96 inches long, 55 inches high, 68 inches wide across the canopy, and 53 inches long at the bottom (Figure 1-4). The evaporator had been placed in four known locations adjacent to the southwest portion of the original 333 East Concrete Pad (Figure 1-3); two locations on the pad and two on the ground immediately south of the pad. When the evaporator was on the ground, it was positioned adjacent to the 333 East Concrete Pad to facilitate the introduction of solvent by means of a forklift with barrel tilter. The evaporator was situated on timbers which elevated it slightly above the pad or ground (Figure 1-5). A steam heating coil, which was added in 1978 or 1979, was situated within the 300 ASE to aid in the evaporation treatment process during the winter months. Steam condensate from the heating coil was discharged on the gravel area near the west side of the evaporator.

Since all waste degreaser solvents (uranium/radioactive and nonradioactive) were added to the 300 ASE, no segregation was made between uranium and non-uranium degreaser solvents. The same barrel pump generally was used to pump solvents from the degreasers into barrels. The degreaser solvent barrels were routinely stored (up to 1 year) within about 20 feet of the evaporator, until poured into the 300 ASE with the barrel tilter. Empty barrels were cycled back to the degreasers for refilling. Small quantities of solvents (from the paint shop and uranium-ethyl acetate-bromine solutions) were poured by hand directly into the evaporator.

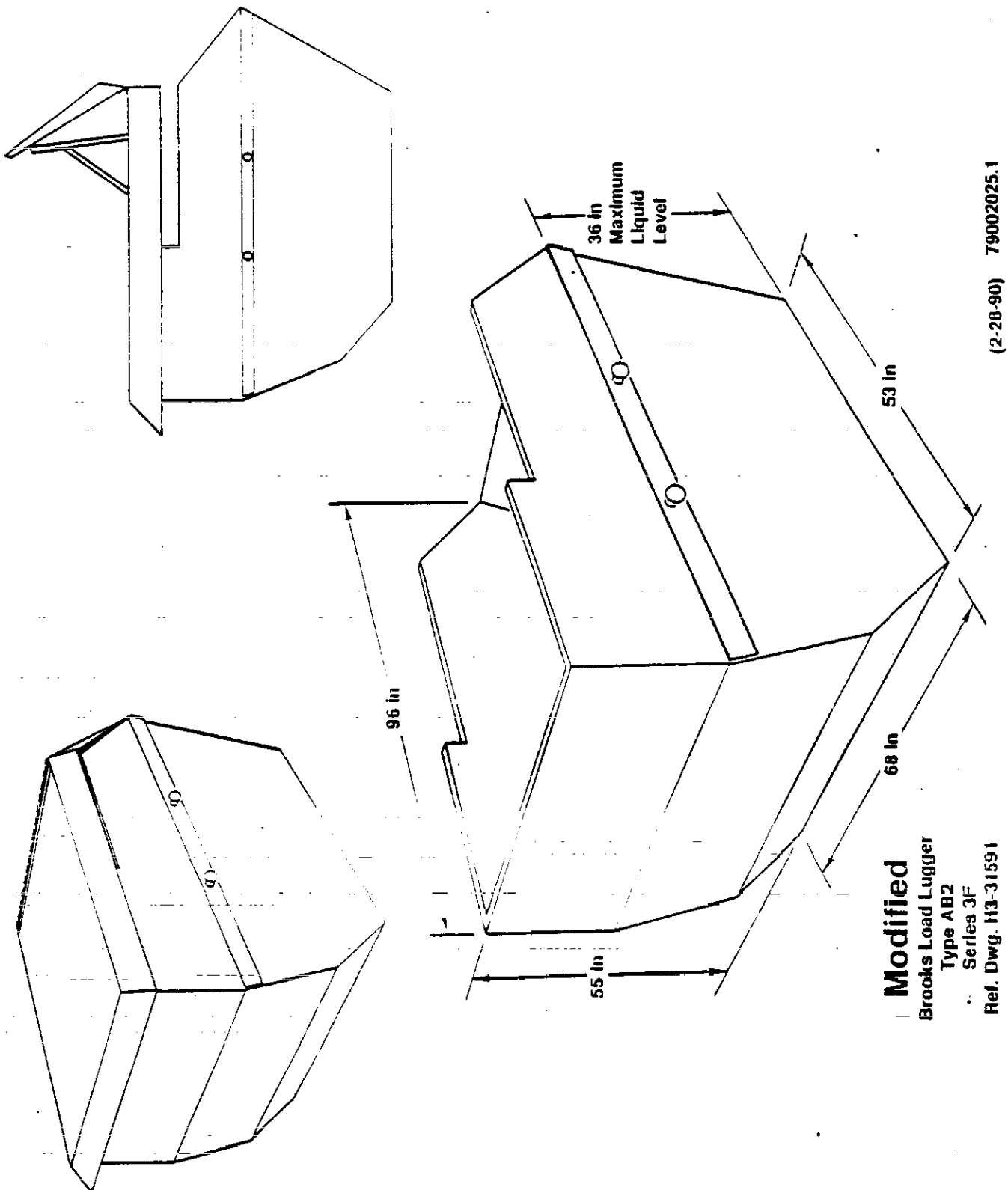
Besides the degreaser solvent barrels, the 333 East Concrete Pad (built in 1965) was used to store the following:

- Uranium and non-uranium contaminated equipment
- Drums of uranium contaminated oils, acid crystals from the waste acid system, water-filled drums of Zircaloy-2<sup>\*</sup>/beryllium chips, and nitric acid containing uranyl nitrate
- Water-filled drums of mixed uranium, Zircaloy-2, copper chips and fines (finely divided uranium and Zircaloy-2 are pyrophoric).

The water-filled drums of uranium chips and fines were the largest single type of material stored on the 333 East Concrete Pad. From 1965 until 1971, these drums were stored while awaiting oxidation in the adjacent 303-L Building, which was shutdown in 1971, then demolished and buried in the

<sup>\*</sup> Zircaloy-2 is a trademark for zirconium with low percentages of tin, iron, chromium, and nickel.

9413293.1963



1 Figure 1-4. Schematic of the 300 Area Solvent Evaporator Unit.

9413293-964

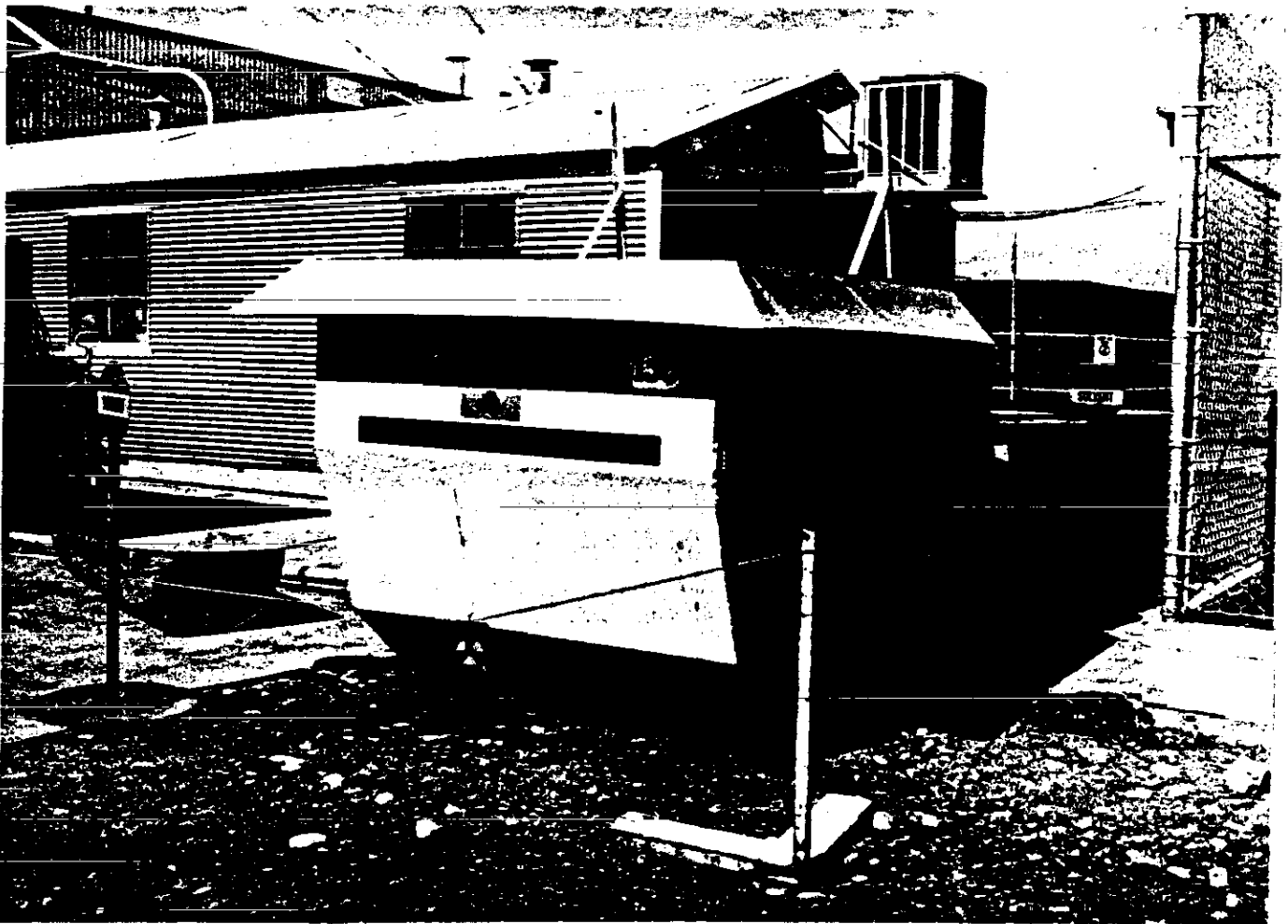


Figure 1-5. A 1985 Photograph of Solvent Evaporator.

1

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940329Z-065

1 mid 1970's. From 1971 until the fall of 1982, up to 140 of these drums  
2 accumulated on the northwest portion of the 333 East Concrete Pad while  
3 awaiting disposal via concretion in the 304 Building. The concretion of this  
4 material was halted in the fall of 1982. Until the new 303-M Building was  
5 constructed and operational in May 1983, the drums of uranium, Zircaloy-2 and  
6 copper chips and fines were moved to the southwest portion of the 333 East  
7 Concrete Pad. By the time the 303-M Building was operable, 540 drums had  
8 accumulated. To reduce the fire hazard, these drums were placed 2 feet apart  
9 and were sprinkled with cold water when the temperature was over 80 °F. All  
10 but the eastern 25 feet of the 333 East Concrete Pad (which sloped eastward)  
11 drained into the floor drain. The drain was about 52 feet from the south and  
12 37 feet from the west edge of the 333 East Concrete Pad (see Figure 1-3).  
13 This drain flowed into the 300 Area Process Sewer.

14  
15 In early 1984, all the uranium contaminated equipment and materials were  
16 moved to the 303-K Building and its concrete and asphalt pad, except for the  
17 following items.

- 18  
19 • Uranium chips and fines were confined to the small concrete pad (berm  
20 divided) on the west side of the 303-M Building which held about  
21 88 drums. This pad utilized the drain to the 300 Area Process  
22 Trenches.
- 23  
24 • The evaporator and waste solvent barrels were stored on the southwest  
25 portion of the original 333 East Concrete Pad (see Figure 1-4).

26  
27 In September 1984, the west side of the present large concrete bermed  
28 fence and pad (minimum thickness of 2.5 inches) was 'poured over' the old  
29 333 East Concrete Pad. The floor drain in the old 333 East Concrete Pad was  
30 plugged to prevent any spills from reaching the 300 Area Process Sewer. The  
31 resulting fenced-in 'overlay pad' was constructed to store nonradioactive  
32 controlled materials for less than 90 days while awaiting analysis and  
33 disposition. Prior to construction of the 'overlay' pad, there was no  
34 designated storage area for the control of nonradioactive materials.

35  
36 Additionally, in the spring of 1985, another concrete overlay pad  
37 (minimum thickness of 2.5 inches) was poured on the east side of the overlay  
38 pad which enlarged the original 333 East Concrete Pad area by 16.3 feet to the  
39 east and drained eastward onto the gravel area. The east side of the overlay  
40 pad has been used by maintenance personnel for the storage of non-controlled  
41 nonradioactive equipment.

42  
43 The 300 ASE closure area consists of two sub-areas (see Figure 1-3), they  
44 are as follows:

- 45  
46 • A gravel area on the south side of the 333 East Concrete Pad  
47 (approximately 10 feet wide by 50 feet long)
- 48  
49 • An area about 50 feet long on the south portion of the original  
50 333 East Concrete Pad that extends about 32 feet to the north and then  
51 tapers towards the original 4-inch diameter pad drain (because of  
52 inadequate documentation, this area must be considered as part of the

closure area even though there were no reported barrel or 300 ASE spills onto either the original or the overlay of the 333 East Concrete Pad).

Figure 1-6, a reproduction from a 1980 photograph, shows the 300 ASE adjacent to the original 333 East Concrete Pad in the eastern most position (approximately 45 feet east of the last 300 ASE location). In this figure, three solvent barrels can be seen to reside on the pad just east of the 300 ASE. The drums in the foreground are water-filled drums of uranium, Zircaloy-2 and copper chips and fines awaiting concretion. The boxes and equipment immediately in front of the 300 ASE are uranium contaminated materials awaiting disposition or reuse.

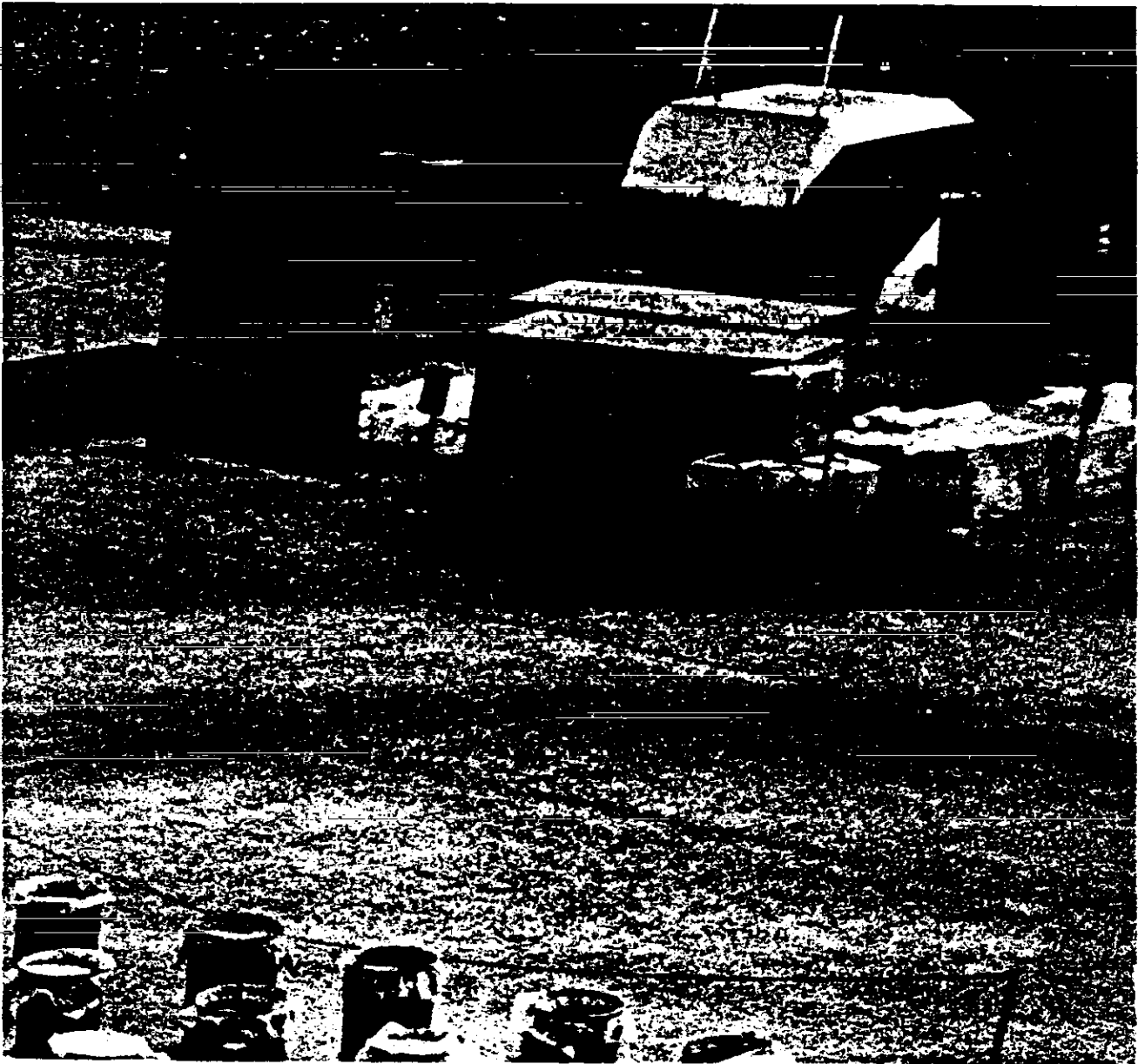
Figure 1-7 is a photograph of the 300 ASE and vicinity while in operation in 1985. Figure 1-8 is a 1990 photograph of the closure area. Figure 1-9 is a 1990 photograph of the 300 ASE closure site and 618-1 Burial Ground.

### 1.1.3 The 618-1 Burial Ground Underlying the Solvent Evaporator

Underlying the entire 300 ASE closure area, at a depth of approximately 4 feet, is an inactive low-level radioactive solid waste burial ground (current Hanford Site waste management identification number 618-1). The 618-1 Burial Ground was in service from 1944 to 1951. The 618-1 Burial Ground received uranium and other metallic and non-metallic materials from the 300 Area fuel fabrication facilities, trace amounts of plutonium (less than 1 gram) and other fission products, and incidental waste from the 300 Area laboratories in operation at that time. Apart from uranium, the metallic materials associated with the fuel fabrication process included graphite, oxides of tin, copper, aluminum, silicon, lithium, magnesium, calcium, and iron; and some stainless steel. Non-metallic materials associated with the fuel fabrication process included fluoride compounds of uranium, magnesium, and calcium; and chloride fluxes of sodium, potassium, and barium. The fission products included isotopes of plutonium and strontium-90. From 1943 to 1971, it is estimated that 10 curies of uranium (16.28 tons of natural uranium) were buried in all of the 300 Area burial grounds. The vast majority of this uranium was buried in the 618-1 Burial Ground, since this burial ground was in service when high uranium loss activities were in operation. These activities included reduction of uranium tetrafluoride to metallic uranium, remelting and casting of billets, and machining of billets and fuel elements. Starting in 1951, these operations were done at the Feed Materials Production Center, Fernald, Ohio. Documentation of the types and amounts of other fission products and incidental laboratory wastes is not available.

The approximate boundaries of the 618-1 Burial Ground are shown in Figure 1-3 and in Appendix B, Figure B-1. The 618-1 Burial Ground covers a total area of 35,520 square feet. Within this total area, there are at least two trenches running north-south, which are approximately 16 feet wide by 230 feet long (at the surface) by 8 feet deep, and a series of 20 feet deep pits running east-west in the south end of the burial ground (Appendix B,





8002368-13CN  
(PHOTO TAKEN 1980)

Figure 1-6. 1980 Photograph of the Solvent Evaporator and Associated Solvent Barrels.

1

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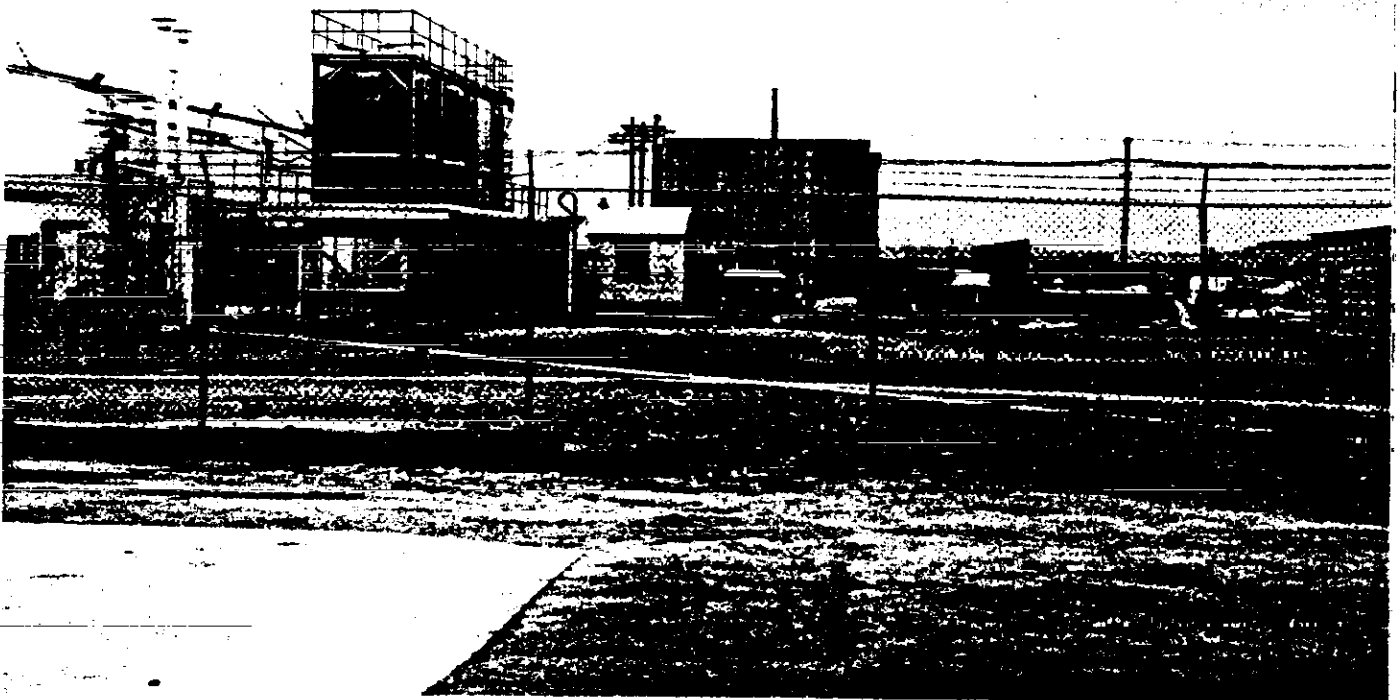
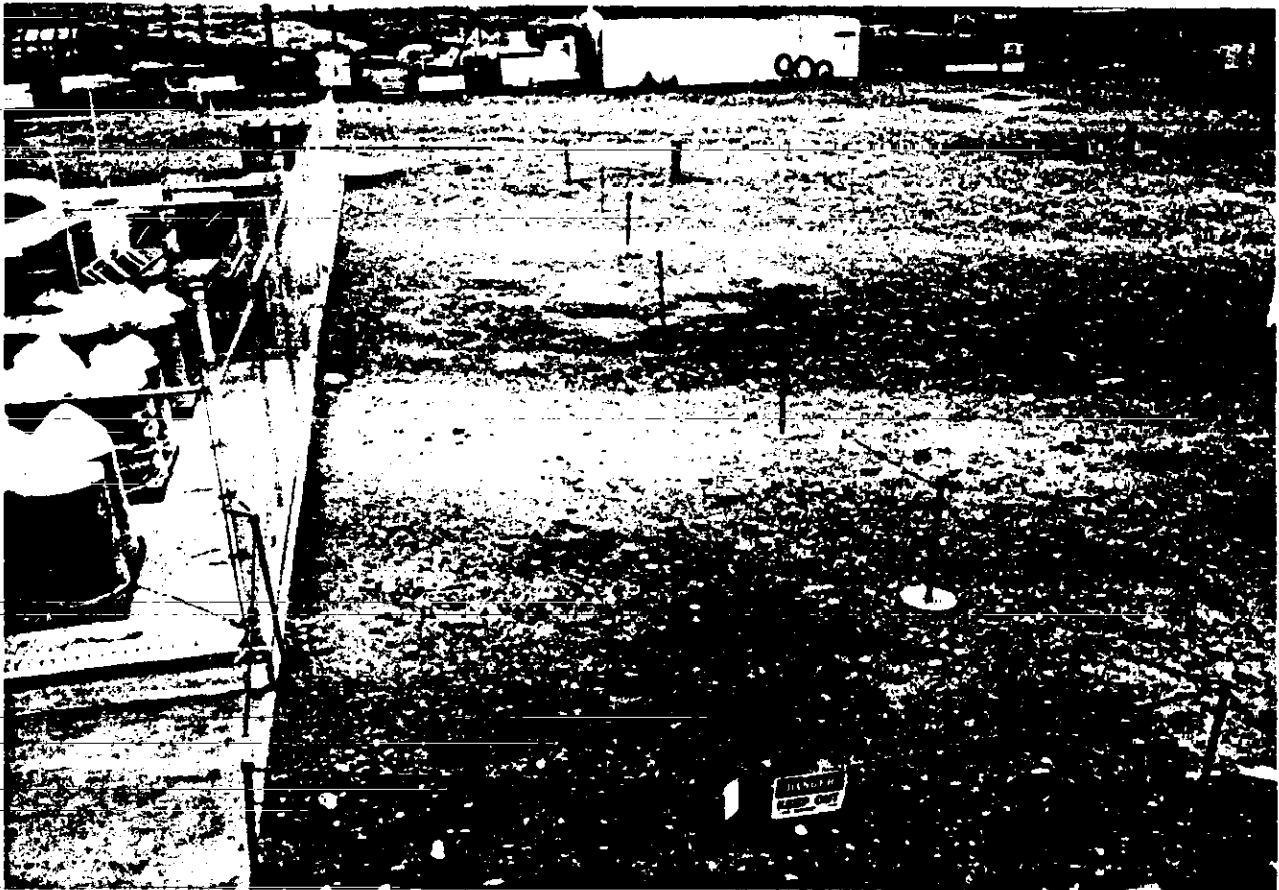


Figure 1-7. A 1985 Photograph of the 300 Area Solvent Evaporator and 618-1 Burial Ground.

1

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90012637-9CN  
(PHOTO TAKEN 1990)

Figure 1-8. A 1990 Photograph of the 300 Area Solvent Evaporator Closure Site.

1  
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9473293.1973

9413293.1974



90012637-16CN

(PHOTO TAKEN 1990)

Figure 1-9.--A-1990 Photograph of 300 Area Solvent Evaporator Closure Site and 618-1 Burial Ground.

1

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9413293.975



Figure B-1). At the end of service (1951), the entire 618-1 Burial Ground typically was covered with 4 feet of fill. Supporting documentation appears in Appendix B regarding the 618-1 Burial Ground boundaries and operations.

The 618-1 Burial Ground has been included by the EPA on the National Priorities List (NPL) of federal sites requiring remedial investigation and regulation under CERCLA. Further information regarding this action is summarized in Sections 3.3 and 3.5.

## 1.2 SECURITY INFORMATION

The entire Hanford Site is a controlled access facility and is expected to remain so for the foreseeable future. The Hanford Site maintains around-the-clock surveillance for protection of government property, classified information, and special nuclear material. The Hanford Patrol maintains a continuous presence of armed guards to provide Hanford Site security.

Access is restricted to operational areas within the Hanford Site. The 300 Area, the location of the 300 ASE, is one such operational area. All personnel entering or leaving the 300 Area must display a DOE-issued security identification badge indicating authorization to enter the area and submit to a search of personal items carried into and out of the area. The 300 Area also has warning signs stating "DANGER--UNAUTHORIZED PERSONNEL KEEP OUT" posted at each entrance to the active portion. These signs are legible from a distance of 25 feet and visible from all angles of approach.

Hanford Site personnel receive security training in the form of required security education and on-the-job training. Procedures for ensuring personnel compliance with security requirements, provisions for security education, and personnel training are maintained at the Hanford Site. Periodic security compliance audits and inspections ensure that these procedures are being followed.

## 1.3 WASTE CHARACTERISTICS

The characteristics of the wastes and other materials associated with the 300 ASE, 618-1 Burial Ground, and process information are discussed in the following sections.

### 1.3.1 Solvent Evaporator Waste

Wastes treated through evaporation in the 300 ASE consisted of approximately 71 percent perchloroethylene, 9 percent 1,1,1-trichloroethane, and 11 percent trichloroethylene by volume (Table 1-1). The remaining 9 percent of the waste consisted primarily of a mixture of ethyl acetate/bromine solution (10 percent bromine). Small amounts of paint shop solvents such as methyl ethyl ketone, methylene chloride, and petroleum naphtha were infrequently placed in the evaporator. Uranium and fuel element metal particulates from degreasing activities were also present in the

evaporator and possibly incidental amounts of oil. Insoluble materials accumulated as sludge in the bottom of the evaporator. According to dangerous waste designation criteria (WAC 173-303-070, -101, -103, -9904, -9905, -9906, and -9907), the initial waste would have the designations WP01, WC01, WT01, F001, F002, F003, F005, and D001 as Extremely Hazardous Waste, largely due to the perchloroethylene (aka tetrachloroethylene) component. A summary of the waste designation calculations is presented in Appendix C.

Table 1-1. Solvent Waste Components.

Waste component	Volume (percent)	Specific gravity
Perchloroethylene	71	1.63
1,1,1-trichloroethane	9	1.34
Trichloroethylene	11	1.46
Ethyl acetate/bromine <sup>a</sup>	9	1.12
Methyl ethyl ketone <sup>b</sup>		0.8
Methylene chloride <sup>b</sup>		1.33
Petroleum naphtha <sup>b</sup>		0.64

<sup>a</sup> Principal component of the remaining 9 percent.

<sup>b</sup> Denotes paint shop solvents that may have been present.

These constituents had a minimal contribution to the overall amount and type of waste handled in the 300 ASE.

In January 1985, a single sample of the 300 ASE solvent was collected for an inorganic analysis, which was performed in March 1985 as part of waste form/storage compatibility activities. The sample was submitted to Pacific Northwest Laboratory (PNL), Richland, Washington, for analysis of uranium by X-ray fluorescence (XRF) and for other elements by inductively coupled plasma-atomic emission spectroscopy (ICP-AES). The lag time between sampling and analysis was the result of routine laboratory practices. The concentrations of the elements analyzed by ICP-AES are presented in Table 1-2. The concentration of uranium in the solvent was below detection limit (less than 10 micrograms per milliliter). The concentrations of beryllium, volatile organic compounds (VOC), and total organic carbon (TOC) were not determined because the Byproduct Ruling (10 CFR 962) was not in effect; therefore, this information was not required.

The ICP-AES analysis was undertaken to evaluate the potential of the solidifying agents for stabilizing the 300 ASE waste. The solidification agent evaluation was based primarily on the proportions of aqueous and organic phases in the sludge. The inorganic analysis was performed to provide general information on the waste content and was not intended to be used as a representative sample for waste characterization or designation purposes. It was already known, via process knowledge, that the waste would be designated as an Extremely Hazardous Waste. Nevertheless, the ICP-AES results indicate the metal content in the waste and are provided in this

Table 1-2. Results of the Inductively Coupled Plasma-Atomic  
Emission Spectroscopic Analysis on Waste Solvent (1985).

	Detection <sup>a</sup> Limit $\mu\text{g/ml}$	NaOH/Zr <sup>b</sup> $\mu\text{g/ml}$	KOH/Ni <sup>c</sup> $\mu\text{g/ml}$	Average $\mu\text{g/ml}$
Aluminum	0.03	6	10	8
Antimony	0.05			
Arsenic	0.08			
Barium	0.002			
Boron	0.01	5	2	4
Cadmium	0.004			
Calcium	0.01	46	52	48
Cerium	0.04			
Chromium	0.02			
Cobalt	0.01			
Copper	0.004			
Dysprosium	0.004			
Europium	0.002			
Gadolinium	0.1			
Iron	0.005	6	78	30
Lanthanum	0.008			
Lead	0.06			
Lithium	0.004	4	2	3
Magnesium	0.06			
Manganese	0.002			
Molybdenum	0.01			
Neodymium	0.02			
Nickel	0.02		ND <sup>d</sup>	
Phosphorus	0.1	18	25	20
Potassium	0.3		ND	
Ruthenium	0.05			
Silicon	0.02	20	28	24
Sodium	0.01	ND	46	46
Strontium	0.002			
Tellurium	0.06			
Titanium	0.02			
Zinc	0.02			
Zirconium	0.008	ND	2	2

<sup>a</sup> ICP-AES analysis performed for the elements listed. No results shown for concentrations below detection limit.

<sup>b</sup> Sodium hydroxide fusion in a zirconium crucible was performed to solubilize the sample.

<sup>c</sup> Potassium hydroxide fusion in a nickel crucible was performed to solubilize the sample.

<sup>d</sup> ND = Not determined.

closure plan as the only analytical data for the 300 ASE waste. As regulations and regulatory authority regarding mixed waste had not been established at the time the sample was taken, no formal notifications were

1 requested or received concerning the sampling or monitoring. Because the  
2 sampling was not conducted to fulfill a regulatory requirement, a formal  
3 sampling plan was not written and the original of the laboratory analysis  
4 documentation was not retained.

5  
6 Beryllium was a possible constituent of the waste, but because its  
7 concentration was not determined, its maximum concentration in the solvent was  
8 calculated. The principle source of soluble beryllium in the waste was from  
9 particulate matter derived from the degreasing of zirconium alloy braze rings.  
10 The braze alloy contained 93 percent zirconium, 4.75 to 5.25 percent  
11 beryllium, 1.2 to 1.7 percent tin, 0.07 to 0.20 percent iron, 0.05 to  
12 0.15 percent chromium, and 0.03 to 0.08 percent nickel by weight. Based on  
13 the composition of this alloy and the amount of zirconium in the solvent  
14 (2 parts per million), the maximum amount of beryllium that could have been  
15 present was about 0.11 parts per million. The equivalent concentration of  
16 this amount of beryllium is 0.000011 percent by weight.

17  
18 Steam condensate that dripped to the soil on the west side of the  
19 evaporator, contained trace amounts of the steam treatment substance  
20 (Dearborn Steamate\* 2004). The Steamate contained diethylaminoethanol,  
21 morpholine, and cyclohexylamine (less than 8 percent each), but because the  
22 steam treatment process involved a mixture ratio of approximately 1 gallon of  
23 treatment mixture to 12,000 gallons of water, the combined solution (steam  
24 condensate) is not a regulated waste.

### 25 26 27 1.3.2 The 618-1 Burial Ground Waste

28  
29 Because of the lack of suitable documentation, the characteristics of the  
30 wastes in the underlying 618-1 Burial Ground are not well known. The only  
31 known documented information is from the Hanford Waste Information Data System  
32 (WIDS) database. Only plutonium-239 and plutonium-240 have been reported as  
33 being in detectable concentrations within the 618-1 Burial Ground, with the  
34 total plutonium inventory calculated to be 0.077 curies decayed through  
35 December 12, 1986. According to this database, other radionuclides and  
36 inorganic and organic contaminants were either not detected or were not  
37 analyzed. However, undocumented information on utilization of the  
38 618-1 Burial Ground indicates that it was a primary site for the disposal of  
39 large quantities of scrap uranium waste (i.e., pieces of end rods for fuel  
40 elements) for all reactor fuel manufacturing operations at the time. These  
41 fuel rods contained naturally occurring uranium. Also, other radioactive  
42 wastes associated with fuel fabrication, and other 300 Area waste activities,  
43 may be buried at this site.

44  
45 Although detailed information on the total amount of waste disposed in  
46 the 618-1 Burial Ground is not available, estimates have been made on the  
47 basis of the extent of the activities during the time of operation. The  
48 618-1 Burial Ground is estimated to have received up to 350 tons of waste

49 \* Steamate is a trademark of the Dearborne Division of W.R. Grace  
50 and Company.

1 occupying a volume of 37,000 cubic yards. The documented maximum inventory of  
2 radionuclides received is estimated to be about 16.28 tons of uranium and  
3 approximately 0.035 ounces of plutonium (Appendix B).  
4  
5

#### 6 1.4 SOLVENT EVAPORATOR PROCESS INFORMATION 7

8 The 300 ASE was utilized for evaporation treatment with associated barrel  
9 storage of volatile spent solvents. Administrative controls were used to  
10 prevent treatment of incompatible solvents in the 300 ASE (see Procedure  
11 UNI-M-46, ECC-114, Appendix D). The evaporation treatment process was  
12 enhanced during the winter months by using a clip-on steam heating coil  
13 immersed in the 300 ASE solutions. Although the temperature of the solvent in  
14 the evaporator was not monitored, the temperature of the steam heating coil  
15 was about 100°C. Steam was delivered to the heating coil through a hose at a  
16 gage pressure of 15 pounds per square inch. The evaporator operated  
17 continuously when use. However, the steam heating coil only operated during  
18 the winter months when solvent levels were highest (see Procedure UNI-M-58,  
19 ECC-14, Appendix D).  
20

21 Perchloroethylene, trichloroethylene, and 1,1,1-trichloroethane were  
22 present in the 300 ASE as waste degreasing solvents, which may have been  
23 contaminated with uranium, Zircaloy-2, and Zircaloy-2/beryllium from  
24 degreasing uranium metal billets, cladding, braze rings, copper, copper-  
25 silicon alloy, and miscellaneous tools and parts. The 300 ASE was established  
26 as a treatment facility (evaporator) mainly for these fuel manufacturing waste  
27 solvents. Trichloroethylene was the primary degreasing solvent treated in the  
28 300 ASE through 1976-77. Perchloroethylene subsequently became the primary  
29 degreasing solvent. Ethyl acetate/bromine solutions from laboratories and  
30 paint solvents from maintenance facilities also were treated in the 300 ASE.  
31 Any nonvolatile components that were only soluble in the solvent (e.g., oil)  
32 would have accumulated as sludge at the bottom of the 300 ASE as the solvent  
33 was evaporated. A process procedure (UNI-M-46, ECC-114, Appendix D)  
34 stipulated that 17C-type 55-gallon drums, designed to receive sludge-type  
35 materials, were kept near the site. However, during the active life of the  
36 300 ASE, there was not enough sludge to warrant clean out or use of the  
37 17C-type drums.  
38

39 Administrative controls limited the use of the 300 ASE to organic  
40 solvents that could not be disposed of through the onsite waste oil system,  
41 and prevented treatment of incompatible solvents (Procedure UNI-M-46, ECC-114,  
42 Appendix D). Heavy oils, greases, and aqueous solutions were disposed of in  
43 accordance with Procedure UNI-M-46, ECC-104 (Appendix D). To ensure proper  
44 operation and maintenance of the evaporator, facility management conducted  
45 inspections on an annual basis (Procedure UNI-M-46, ECC-114, Appendix D).  
46

47 No special procedures or precautions existed to preclude possible leaks  
48 from the evaporator or to test its integrity. However, based upon normal  
49 procedures, it is assumed that initially, the evaporator was visually  
50 inspected for flaws, and informal inspections of the evaporator were conducted  
51 over the period of its use by personnel in adjoining buildings on an irregular  
52 basis. The evaporator was elevated off the ground on timbers to facilitate

1 the detection of any leak. The evaporator also was isolated from normal  
2 traffic flow to minimize potential accidents.

3  
4 The typical process for emptying the waste solvent barrels was to pour  
5 them through the hinged top into the evaporator with the forklift barrel  
6 tilter, while under the supervision of operations personnel. If the  
7 evaporator was at or near its maximum capacity, the barrels were temporarily  
8 stored on the 333 East Concrete Pad adjacent to the evaporator (Figure 1-3).  
9 Although no records were retained on how long the barrels were stored, it  
10 could have been from 6 months to 1 year before the waste was poured into the  
11 evaporator. Barrels were stored on pallets to elevate them above the 333 East  
12 Concrete Pad and away from possible accumulated rainwater. Forklifts,  
13 equipped with barrel-handling attachments, were used for barrel relocation and  
14 large volume solvent transfers to the evaporator.

15  
16 Solvent was poured into the evaporator in one of three ways: (1) large  
17 containers (55-gallon barrels) were lifted with a forklift equipped with  
18 barrel-handling attachments (barrel tilter) and poured into the evaporator;  
19 (2) the barrels were pumped out with a portable pump; or (3) the contents of  
20 smaller containers were poured into the evaporator by hand. Internal job  
21 control procedures (Appendix D) were used in the process to prevent spills and  
22 health hazards during operation of the evaporator, because no special  
23 regulatory procedures were specifically implemented. This particular type of  
24 operation relied on the skills and experience of the operator to prevent  
25 spills and to ensure that the work was performed safely.

26  
27 The empty solvent barrels generally were not rinsed as they were reused  
28 several times for the same purpose. Occasionally, empty barrels may have been  
29 temporarily stored on the 333 East Concrete Pad pending disposal or returned  
30 to the degreasers for reuse. At the end of the barrel's useful life, it was  
31 crushed and disposed of as radioactive waste.

32  
33 The 333 East Concrete Pad was utilized for other non-300 ASE uses;  
34 e.g., uranium-contaminated equipment and materials storage as noted in  
35 Section 1.1.2. It was primarily the other usages and expansion and subsequent  
36 fencing of the 333 East Concrete Pad that necessitated the relocation of the  
37 300 ASE during its 10-year operating life.

38  
39 Over the 10-year life of the 300 ASE, approximately 6,000 gallons  
40 of regulated waste were treated through evaporation, or an average of  
41 approximately 600 gallons per year (see Section 3.2.1 and Appendix A).  
42 The Maximum Treatment Capacity (process design capacity) has been estimated at  
43 approximately 220 gallons per day (Appendix A). The 300 ASE had a maximum  
44 fill depth of 3 feet which allowed a maximum storage capacity of about 800  
45 gallons (overflow volumetric limit).

46  
47 On two occasions, the Hanford Environmental Health Foundation performed  
48 temporary ambient air monitoring near the 300 ASE using pre-calibrated battery  
49 operated pumps and charcoal sorption tubes. Samples were analyzed by gas  
50 chromatography. The results of air monitoring are documented in two letter  
51 reports, as presented in Appendix F.

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1 Only one spill is known to have occurred at the 300 ASE. Although no  
2 formal spill report was written, it is known that between March 1 and 14,  
3 1985, water from steam condensate overflowed the evaporator. This water was  
4 discharged onto the soil at the last evaporator location, as shown in  
5 Figure 1-4. This spill resulted when a small hole developed in a metal  
6 fitting attached to the steam coil that allowed steam condensate (i.e., water)  
7 to slowly fill the evaporator to overflowing.  
8

9 The overflow would have spilled from the cutout (north facing) side of  
10 the evaporator. Because this angled side of the evaporator overhung the  
11 northern edge of the 333 East Concrete Pad, some of the overflow could have  
12 possibly discharged onto the concrete; however, it has been estimated that  
13 little, if any, solvent was present in the overflow because the solvents have  
14 higher densities than water (Table 1-1). Thus, only very small amounts of the  
15 solvents dissolved in the water (Section 3.3), could have overflowed the  
16 evaporator. Although there have been no records of solvent leaks from the  
17 barrels stored on the concrete pad, the consequences of an undetected leak  
18 onto the concrete were evaluated together with those of evaporator spillage  
19 onto the concrete.  
20

21 Worst-case scenarios of spills onto the soil and onto the concrete were  
22 developed in conjunction with the Sampling and Analysis Plan (Appendix E,  
23 Section E-2, Contamination Scenarios and Assessments) to calculate the types  
24 and amounts of residual waste materials that could be expected to remain in  
25 the soil and in the concrete. The modeling results for spillage onto the soil  
26 have indicated that no significant amount of water/solvent should remain in  
27 the soil. Similarly, the modeling results for spillage onto the concrete have  
28 indicated that no significant amount of solvent from barrel leakage should  
29 remain in the concrete.

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## 2.0 CLOSURE PERFORMANCE ACTIVITIES

The clean closure for the 300 ASE will continue to perform the following functions.

- Protect human health and the environment by controlling, minimizing, and/or eliminating the escape of dangerous waste, dangerous waste constituents, leachate, contaminated run-off, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere.
- Restore the land to a condition that will support its intended subsequent use given the nature of the previous regulated waste activity.
- Minimize the need for further maintenance.

The closure of the 300 ASE involves the following steps.

1. Removal and solidification of the solvent waste (completed 1985).
2. Cleaning and demolition of the 300 ASE unit and associated waste barrels (completed 1986).
3. Transportation and disposal of the solvent waste and the 300 ASE facility (completed 1986).
4. Soil and concrete sampling and analysis will be initiated following Ecology's approval of the sample plan.
5. Evaluation of sampling data will start after completion of field sampling activities.
6. Closure of the facility: Clean closure if the soil and concrete are not contaminated from 300 ASE constituents; otherwise, it is proposed that final disposition of the site should be determined through the Remedial Investigation/Feasibility Study in conjunction with Operable Unit 300-FF-2.
7. Ecology's acceptance of the results/evaluation of soil and concrete sampling.

The first three steps were completed in 1985 and 1986 and are discussed in detail in Section 3.2.

The 300 ASE Closure Plan will be available in Public Reading Rooms as part of the Administrative Record for the *Hanford Federal Facility Agreement and Consent Order*.

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### 3.0 DESCRIPTION OF CLOSURE ACTIVITIES

The primary strategy for closure of the 300 ASE is clean closure of the site. In 1985 and 1986, initial closure activities involved removing the waste inventory and dismantling the facility to minimize potential danger to onsite personnel and the environment. The closure activities that remain to be performed include (1) soil and concrete sampling and analysis to evaluate contamination of the closure area, (2) evaluation of data, and (3) closure of the facility.

Clean closure of the site is contingent on verification of an absence of soil and concrete contamination originating from the 300 ASE. This contingency is to be assessed using information obtained from implementation of the Soil and Concrete Sampling and Analysis Plan (Appendix E). In the event that more extensive remediation is required (i.e., clean closure is not possible or practical), the remaining activities necessary for final closure/post-closure monitoring are proposed to be performed in conjunction with the inactive site activities planned for Operable Unit 300-FF-2.

Because the 618-1 Burial Ground completely underlies the 300 ASE site, assessment of any potential impact on groundwater resulting separately from the 618-1 Burial Ground is not possible. Given these special conditions, groundwater sampling and analysis are not included in the closure activities associated with the 300 ASE. Clean closure of the facility will be based on information derived from implementing the soil and concrete sampling and analysis plan.

#### 3.1 MAXIMUM EXTENT OF OPERATION

The active life of the 300 ASE facility ceased in November 1985 (Table 3-1). The maximum extent of operation is known to have been exceeded only once at the time of the steam heating coil failure that filled the evaporator with water to overflowing.

#### 3.2 REMOVAL AND MANAGEMENT OF HAZARDOUS WASTES

Information concerning the removal and management of hazardous waste is presented in the following sections.

##### 3.2.1 Estimate of Maximum Inventory of Hazardous Wastes

The 300 ASE received solvents used in the 300 Area reactor fuel manufacturing facilities. The maximum annual inventory of hazardous wastes treated at any time during the life of the facility was approximately 600 gallons. Thus, the maximum volume of chemicals treated in the 300 ASE over the 10-year operating term has been estimated to be 6,000 gallons. Perchloroethylene constituted approximately 71 percent (4,260 gallons),

1 11 percent was trichloroethylene (660 gallons) and 1,1,1-trichloroethane was  
2 approximately 9 percent (540 gallons). The remaining 9 percent (540 gallons)  
3 was composed of primarily ethyl acetate/bromine, with some paint shop solvents  
4 (see Table 1-1).  
5

6 **Table 3-1. Chronology of 300 Area Solvent Evaporator Closure Activities.**

7	Date	Activity
8	January 1985	Water solvent sampled
9	March 1985	Analysis performed on waste solvent
10	August 1985	Deliveries to 300 ASE suspended; last solvents added
11	September 1985	Part A application submitted to Ecology and EPA
12	November 1985	Heating process terminated; final shutdown; solidification of final waste inventory initiated; demolition initiated Interim Status Closure Plan (Rev. 0) submitted to Ecology and EPA
13	February 1986	Disposal of solidified waste inventory at the 200 West Area Low-Level Burial Ground
14	March 1986	Demolition of 300 ASE facility completed
15	July 1986	Disposal of burial box containing the dismantled 300 ASE and equipment in 200 West Area Low-Level Burial Ground
16	April 1988	Submittal of revised 300 ASE Interim Status Closure Plan (Rev. 1) to Ecology
17	September 1988	Notice of Deficiency on Closure Plan (Rev. 1) received from Ecology
18	February 1989	Submittal of revised 300 ASE Closure Plan (Rev. 2) to Ecology
19	April 1989	Notice of Deficiency on Closure Plan (Rev. 2) received from Ecology
20	January 1990	Ecology accepts the NOD responses and authorizes submittal of the 300 ASE Closure Plan (Rev. 3) by March 30, 1990
21	March 1990	Submittal of revised 300 ASE Closure Plan (Rev. 3) to Ecology
22	November 1990	Notice of Deficiency on Closure Plan (Rev. 3) received from Ecology
23	February 1991	Ecology accepts NOD responses and authorizes submittal of page changes (Rev. 3A) for 300 ASE Closure Plan
24	June 1991	Page changes issued to document holders
25	June 1992	Ecology requested additional page changes
26	September 1992	Page changes (Rev. 3B) issued to document holders.

1 The maximum inventory of hazardous wastes (i.e., the maximum amount of  
2 waste in the unit at any one time) would have been 800-gallons volumetric  
3 overflow capacity).

### 6 3.2.2 Removal and Management of Hazardous 7 Waste Inventory

9 After August 1985, spent solvents were no longer received from the  
10 operating facilities. Final shutdown was initiated in November 1985 when the  
11 treatment process was terminated. The remaining solvents staged at the nearby  
12 concrete pad and from the evaporator were stabilized with absorbent agents.  
13 Approximately 500 gallons of spent solvent remained in the 300 ASE at that  
14 time and the following steps were taken to remove and solidify the solvent  
15 waste. A copy of a sample procedure for the solidifying and packaging of  
16 waste solvents (UNI Process Work Request Number B-441 and UNI-M-57, D-411) is  
17 included in Appendix D.

- 19 1. Obtained equipment (e.g., steel pan, hand pump, shovel, air mixer,  
20 forklift truck, empty 30- and 55-gallon 17-H drums) and materials  
21 (e.g., dolomite, water, Envirostone<sup>\*</sup> liquid emulsifier and cement).
- 23 2. Placed a 30-gallon drum with lid inside a 55-gallon drum and utilized the  
24 steel pan as a catch basin.
- 26 3. Filled the void between the drums with dolomite, an inert filler  
27 material, and then removed the lid from the 30-gallon drum.
- 29 4. Pumped 13 gallons of liquid solvent, 6.5 gallons of water, and  
30 1.5 gallons of Envirostone liquid emulsifier into the 30-gallon drum.
- 32 5. Used an air operated mixer to stir contents of the 30-gallon drum for two  
33 minutes.
- 35 6. Added 160 pounds of Envirostone cement to the 30-gallon drum contents  
36 with mixer running and stirred for an additional 10 to 15 minutes.
- 38 7. Moved drums via forklift truck to the adjacent concrete storage pad and  
39 allowed cement to cure for at least 24 hours.
- 41 8. Repeated steps 2 through 7 until all of the liquid solvent and solvent  
42 sludge, which was removed with a shovel from the bottom of the 300 ASE,  
43 had been solidified.
- 45 9. Placed contaminated tools in the 300 ASE and rinsed tools, as well as the  
46 300 ASE, and solidified the rinsate by performing steps 2 through 7.
- 48 10. Filled remaining space in the 30-gallon drums with dolomite and sealed  
49 drum with lid, lock ring, and bolt.

51 \* Envirostone is a trademark of the U.S. Gypsum Company.

1 11. Filled void space between 30- and 55-gallon drums with dolomite.

2  
3 12. Sealed the 55-gallon drums, labeled, and radiologically surveyed.

4  
5 13. Placed drums in the waste materials storage area east of the  
6 333 Building until shipped for disposal.

7  
8 **3.2.2.1 Cleaning and Demolition of Solvent Evaporator.** After the liquid and  
9 sludge were removed from the evaporator, the inside of the evaporator was  
10 covered with a residue. This residue was removed during the equipment  
11 cleaning process. Some residual perchloroethylene and 1,1,1-trichloroethane,  
12 however, may have remained in the 300 ASE. No verification samples were  
13 taken, since none were required for mixed waste at that time. The 300 ASE was  
14 rinsed thoroughly with water during the cleaning process (see step 9,  
15 Section 3.2.2), although scrubbing or pressure spraying was not utilized in  
16 the rinsing process.

17  
18 After the metal dumpster was cleaned, a slight amount of oxidation was  
19 noticed; however, the dumpster appeared to be in good condition. The electric  
20 pump and tools were rinsed with water, wiped down and checked by a radiation  
21 monitor, and set aside for further use. Rinse water was solidified and  
22 disposed of together with the solidified solvent.

23  
24 By the end of March 1986, the 300 ASE had been cut up using a cutting  
25 torch, which avoided contaminating mechanical cutting tools. Then the pieces  
26 were placed in a standard 4 by 4 by 8-foot (128 cubic feet) plywood burial  
27 box, designated C-39 (see Burial Checklist 3-5B-1A-1 in Appendix D).  
28 Clothing, miscellaneous paper, plastic products, cloth utilized during this  
29 operation, the heating coil, and related piping were disposed of in this box.  
30 The void space in the box was partially filled with inert absorbent material  
31 (vermiculite clay). A sample copy of a Fuels Maintenance Work Authorization  
32 for cutting up and boxing of the 300 ASE is provided in Appendix D.

33  
34 **3.2.2.2 Transport and Disposal of Solvents and Solvent Evaporator.** The drums  
35 of solidified solvents, rinsate, and the 300 ASE burial box were transported  
36 in compliance with U.S. Department of Transportation regulations (DOT 1988).  
37 The drums and 300 ASE burial box were loaded by a forklift truck onto a  
38 semi-trailer truck and transported to the 200 West Area Low-Level Burial  
39 Grounds. Fifty-seven 55-gallon drums of solidified solvent, sludge, and  
40 rinsate were generated from the cleanup effort and buried during  
41 February 1986 (Burial Compliance Checksheets 3-1A-7G-1, 3-1A-7L-1, and Burial  
42 Record 313-UNC-80-10; Appendix D). The 300 ASE burial box had a total volume  
43 of 128 cubic feet and was buried in July 1986 (Burial Compliance Checksheet  
44 3-5B-1A-1 and Burial Record 313-UNC-86-4).

45  
46 **3.2.2.3 Hazardous Waste Management Units.** All hazardous waste management  
47 units at the Hanford Site are under the EPA/State Identification  
48 Number WA789008967, which provides interim operating status designation.

### 3.3 DECONTAMINATION AND REMOVAL OF HAZARDOUS WASTE RESIDUES

The extent to which hazardous waste residues from the 300 ASE exist or persist in the soil at the site, will be evaluated by means of a Soil and Concrete Sampling and Analysis Plan (Appendix E). Based on the spill scenario described in Section 1.4, and the nature of the wastes (i.e., specific gravities), it is likely that little, if any, waste was discharged from the 300 ASE when it was inadvertently filled with water to overflowing from the leaky steam heating coil system. The amount of primary solvents in the 300 ASE expected to have been discharged with the less dense water for a 100-gallon spill, is estimated to be a maximum of 200 milliliters for 1,1,1-trichloroethane and 50 milliliters for perchloroethylene, based on solubilities (25°C values) alone. Such small amounts of solvent evaporator volatile components (if any) also would be likely to have since evaporated from the soil (Appendix E, Section 2.4.1).

Evaluation of the type and extent of potential contamination present in the soil and concrete resulting from operation of the 300 ASE could have been affected by the possible upward migration of waste (e.g., by vapor or gas transport) from the underlying 618-1 Burial Ground, and also due to the uncertainties associated with sources of the engineered soil cover. Because of these uncertainties, soil and concrete analysis will be largely confined to those waste constituents known, and suspected to be associated with the 300 ASE (see Appendix E, Sections E-1.2.1 and E-1.2.2).

Inorganic constituents having concentrations at or below detection limits in the analysis of the raw waste (Table 1-2) have been omitted from the list of constituents to be analyzed. The elements silicon, aluminum, iron, calcium, sodium, and phosphorous also have been excluded as they are primary constituents in the native rocks and soils that occur at concentrations far in excess (1,000 to 500,000 micrograms per gram) of those in the raw waste (less than 100 micrograms per gram). The amounts of fuel fabrication related inorganic constituents in the initial solvent alone, as well as those that would remain as residue in the soil after evaporation, are below the regulated concentrations. For example, the maximum amount of beryllium in the initial solvent, is significantly below regulated concentrations (equivalent concentration of 0.000011 weight percent; WAC 173-303-9906). However, the inorganic fuel fabrication related constituents have been included in the list of analytes (Table 3-2) as a conservative measure. All organic constituents obtained by Methods 8240 and 8270 (SW-846, EPA 1986) will be analyzed because they are measured concurrently in the analysis. However, only those known and suspected to be associated with the 300 ASE will be evaluated for closure purposes. The other data will be reported for informational purposes, as Ecology has requested.

Evaluation of the 300 ASE soil will be based on the composition of the soil compared to the composition of the local background soil for the constituents listed in Table 3-2. The local background, i.e., the soil cover for the 618-1 Burial Ground, is referred to here as the baseline. This baseline material is intended to serve a special type of local or area background (Ecology 1991) because it consists of soil that was introduced to the area as a cover for the underlying burial ground that may be distinct from

other natural or anthropogenic background in the area. Justification for the selection of the baseline and for baseline sample locations is provided in Appendix E, Section E-5. The constituents listed in Table 3-2.

**Table 3-2. The 300 Area Solvent Evaporator Analytes and Performance Standards.**

Category-Constituent	Initial action level		Alternative action level	
	Soil	Concrete	Soil	Concrete
1- 300 ASE primary organic constituents				
Perchloroethylene (PCE)	a	b	c	c
1,1,1-trichloroethane (TCA)	a	b	c	c
Trichloroethylene (TCE)	a	b	c	c
Methyl ethyl ketone (MEK)	a	b	c	c
Ethyl acetate	a	b	c	c
Dichloromethane (methylene chloride)	a	b	c	c
Petroleum naptha	c	c	-	-
2- 300 ASE secondary organic constituents (i.e., degradation products)				
1,1-dichloroethylene (DCE)	a	b	c	c
trans-1,2-dichloroethylene (DCE)	a	b	c	c
1,1-dichloroethane (DCA)	a	a	c	c
1,2-dichloroethane (DCA)	a	b	c	c
Vinyl chloride	a	b	c	c
3- Inorganic constituents (related to fuel fabrication)				
Zirconium	a	d	b	d
Beryllium	a	d	b	d
Bromine	a	d	b	d
Uranium	d	d	d	d
Copper	a	d	b	d
4- Inorganic constituents (related to paint shop solvents)				
Barium	a	d	c	d
Cadmium	a	d	c	d
Lead	a	d	c	d
Silver	a	d	c	d

a Concentrations that exceed baseline (local background) threshold levels.

b Concentrations that exceed limits of quantitation (LOQ), i.e., the level above which quantitative results may be obtained with a specified degree of confidence, is defined by the American Chemical Society (1983) as  $10\sigma \pm 3\sigma$  at the 99 percent confidence level, where  $\sigma$  is the standard deviation of the instrumental background noise.

c Concentrations that exceed human health-based protection or safety levels (Appendix E-3); contingent on approval by Ecology.

d No action level. Concentration determined for information only.



are those known or suspected to be associated with the 300 ASE that were not excluded for reasons stated previously. These constituents comprise four categories of contaminants and specific constituents as listed in Table 3-2.

1. Solvents and organic compounds known to have been introduced to the 300 ASE.

2. Organic solvent degradation products not included in the first category.

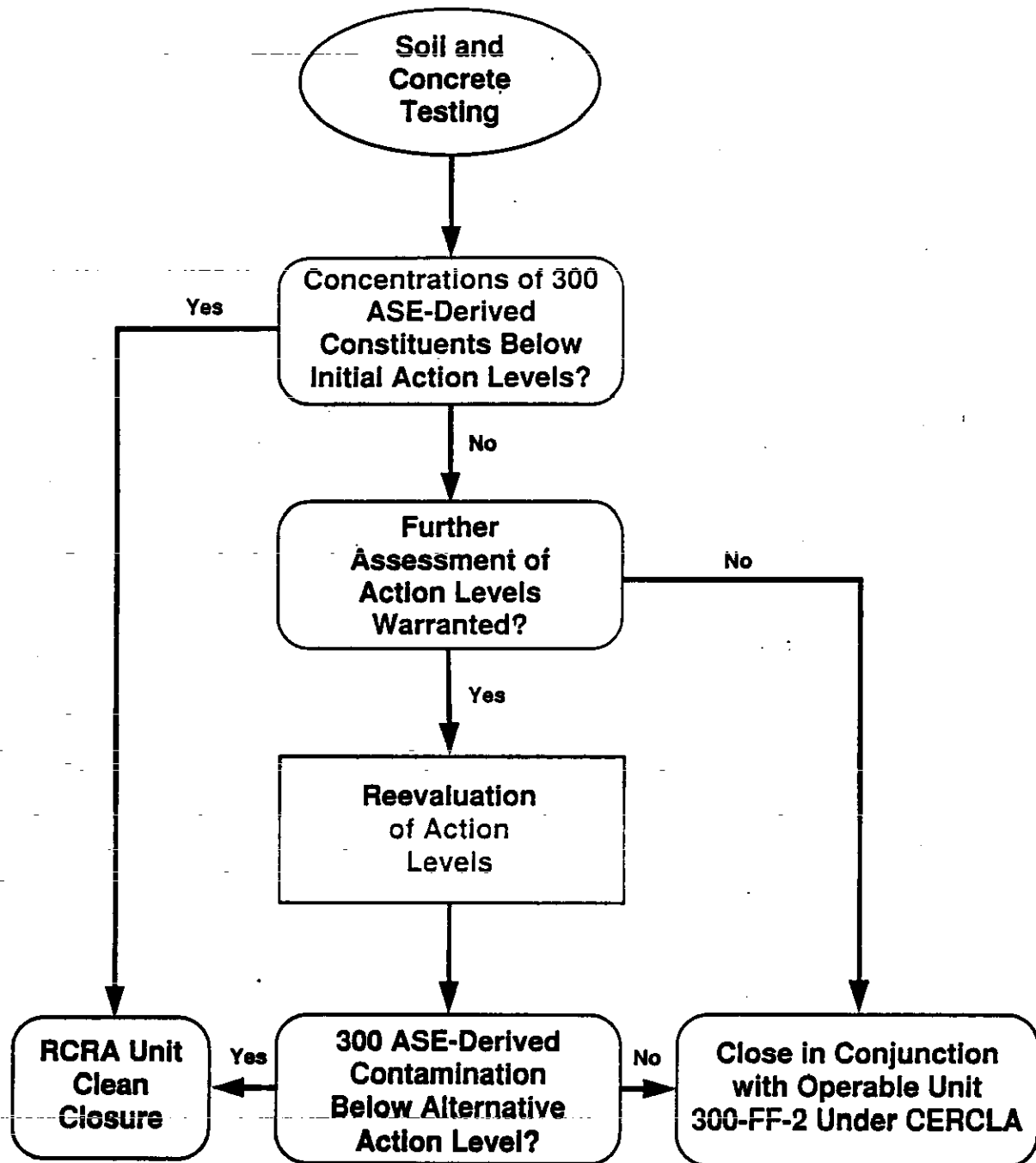
3. Inorganic constituents from fuel element fabrication.

4. Inorganic constituents from other materials known or suspected to have been introduced into the 300 ASE (e.g., associated with paint shop solvents) that are potentially dangerous wastes (e.g., WAC-173-303-9905).

Concrete samples will be analyzed for the same constituents as soil samples (Table 3-2). The action levels for the 300 ASE solvent waste species in constituent categories (1) and (2) identified in Table 3-2 are the primary concrete performance standards for several reasons that are discussed in Appendix E-1.2.2. The main reasons are that very small amounts of inorganic constituents, if any, would have accompanied spills or leaks from the 300 ASE, and also because it would not be possible to discriminate very small amounts of 300 ASE-derived inorganic contamination from those attributable to past practice operations. Thus, inorganic constituents in the 333 East Concrete Pad will be handled in conjunction with the 300-FF-2 Operable Unit remedial actions. Ecology's final decisions regarding the closure of the 300 ASE, however, will be made on the basis of all data.

Clean closure is to be predicated on the premise that the constituents from the 300 ASE are not present in the soil or concrete in the closure area; or if present, are at concentrations statistically below baseline threshold values, or are at concentrations protective of human health and the environment. These performance standards are referred to here as action levels. The action levels are identified in Table 3-2 and are described in Section E-1.4 of Appendix E. The decision tree illustrated in Figure 3-1 describes the closure options to be followed. If the concentration of any of the constituents identified in Table 3-2 are statistically above the initial action levels, continued efforts to clean close the facility will be based on the type and extent to which an action level is exceeded and on further assessment of future activities necessary to protect human health and the environment. These assessments include evaluations of health-based risk using data from sources such as the EPA Integrated Risk Information System [IRIS (EPA 1991)], the Health Effects Assessment summary tables (EPA 1989). The DOE-RL will request approval for the use of alternative action levels from Ecology's for closure of the 300 ASE, where warranted. If clean closure conditions cannot be met, closure will be performed in conjunction with Operable Unit 300-FF-2 as identified in Section 3.4 (Figure 3-1).

Initial action levels for both organic and inorganic constituents in soil will be based on statistical variation from baseline values as described in Appendix E. Baseline values for soil in the case of the 300 ASE will be obtained from analyses of the soil covering the underlying 618-1 Burial Ground, excluding the closure area and areas of known disturbances.



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Figure 3-1. Decision Tree for Closure Options.

1 Alternative action levels will be based on health-based limits  
2 (Appendix E-1.4). Closure of the 300 ASE should be based primarily on the  
3 concentrations of organic constituents listed in Table 3-2 because they are  
4 the only reliable indicators of 300 ASE derived contamination. However, all  
5 data will be reviewed by Ecology in the decision process.

6  
7 As described in Appendix E, a total of 15 soil samples will be taken:  
8 six samples and one duplicate from the 300 ASE soil closure area (Figure 3-2),  
9 and eight baseline samples from the 618-1 Burial Ground cover (see  
10 Figure 3-3). A total of 14 concrete samples (including one duplicate) from  
11 the concrete closure area will be collected from five concrete core sampling  
12 sites as shown in Figure 3-4 and described in Appendix E.

13  
14 If concentrations of the components identified in Table 3-2 are not  
15 statistically above these action levels, it will be concluded that no  
16 contamination from the 300 ASE exists or remains in the soil or concrete.  
17 The 300 ASE will be considered clean closed under RCRA and WAC-173-303, upon  
18 Ecology's acceptance of the results and evaluation of the soil and concrete  
19 sampling and analysis plan.

20  
21 The presence of organic constituents in the soil (closure area and  
22 baseline), other than those listed in Table 3-2, will be regarded as  
23 originating from the underlying 618-1 Burial Ground or other operations in the  
24 300 Area. Elevated concentrations of inorganic constituents in baseline  
25 samples will be interpreted in the same manner. Any remedial action for such  
26 contaminants will be evaluated in conjunction with the Remedial  
27 Investigation/Feasibility Study of Operable Unit 300-FF-2.

28  
29 In the event that clean closure is not possible, the facility will be  
30 subjected to remediation in conjunction with CERCLA, whereby remediation will  
31 be evaluated as part of the Remedial Investigation/Feasibility Study of  
32 Operable Unit 300-FF-2. This is proposed because the proximity of the  
33 300 ASE site to the underlying 618-1 Burial Ground precludes other types of  
34 RCRA closure. If the decision is made to close in conjunction with CERCLA,  
35 details of any decontamination efforts that are necessary as part of the clean  
36 closure or Remedial Investigation/Feasibility Study efforts will be based on  
37 the results of soil and concrete sampling and analyses and submitted as an  
38 amendment to the closure plan.

### 39 40 41 3.4 OTHER ACTIVITIES REQUIRED FOR CLOSURE

42  
43 If no soil or concrete contamination is found, no additional activities  
44 are required. If clean closure is not possible, further closure activities  
45 will be performed in conjunction with the Operable Unit 300-FF-2 remedial  
46 action.

### 47 48 49 3.5 SCHEDULE FOR CLOSURE

50  
51 Upon approval of this plan, schedules for sampling and analysis of  
52 soils and concrete will be finalized. Table 3-3 is the sampling duration

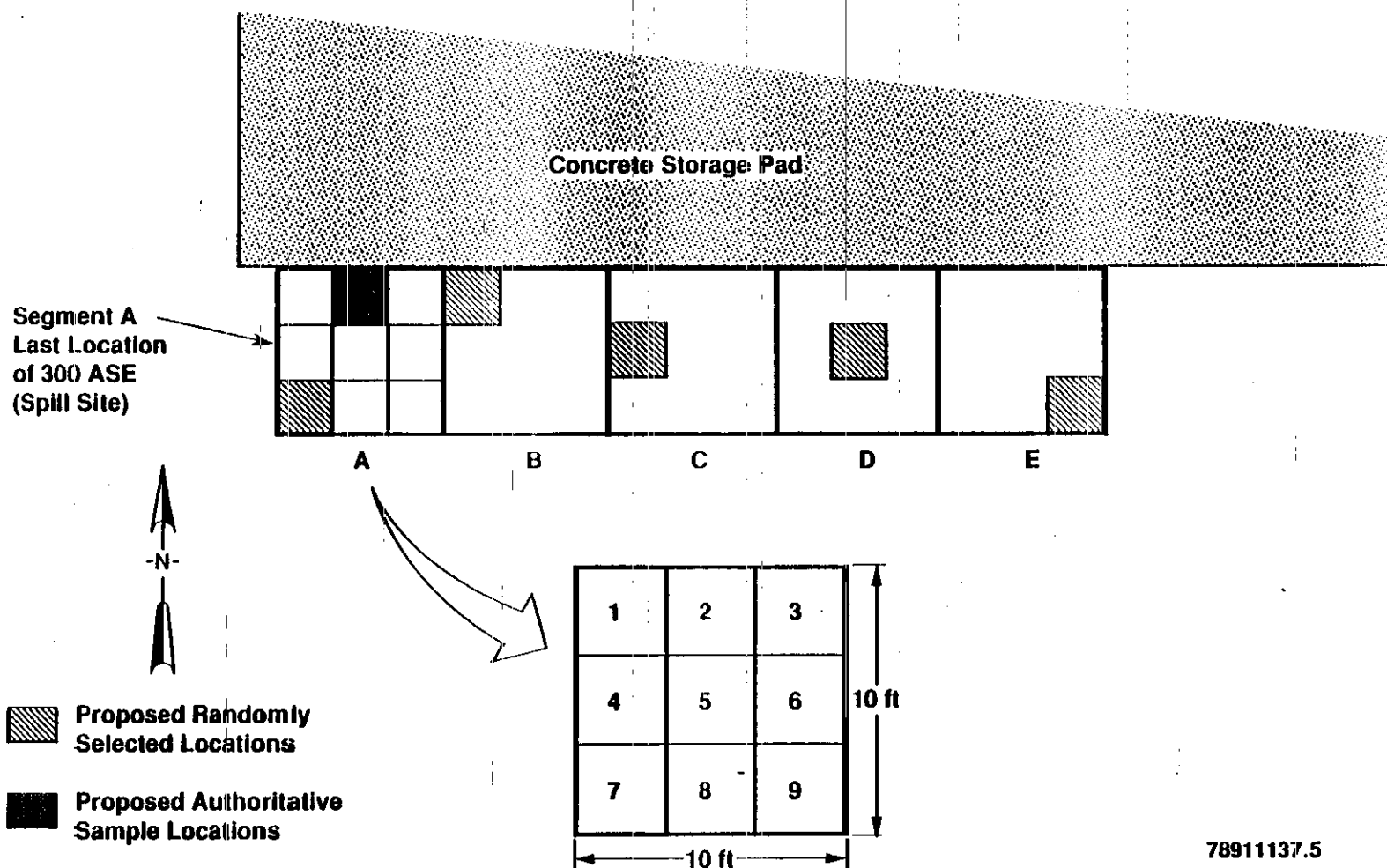
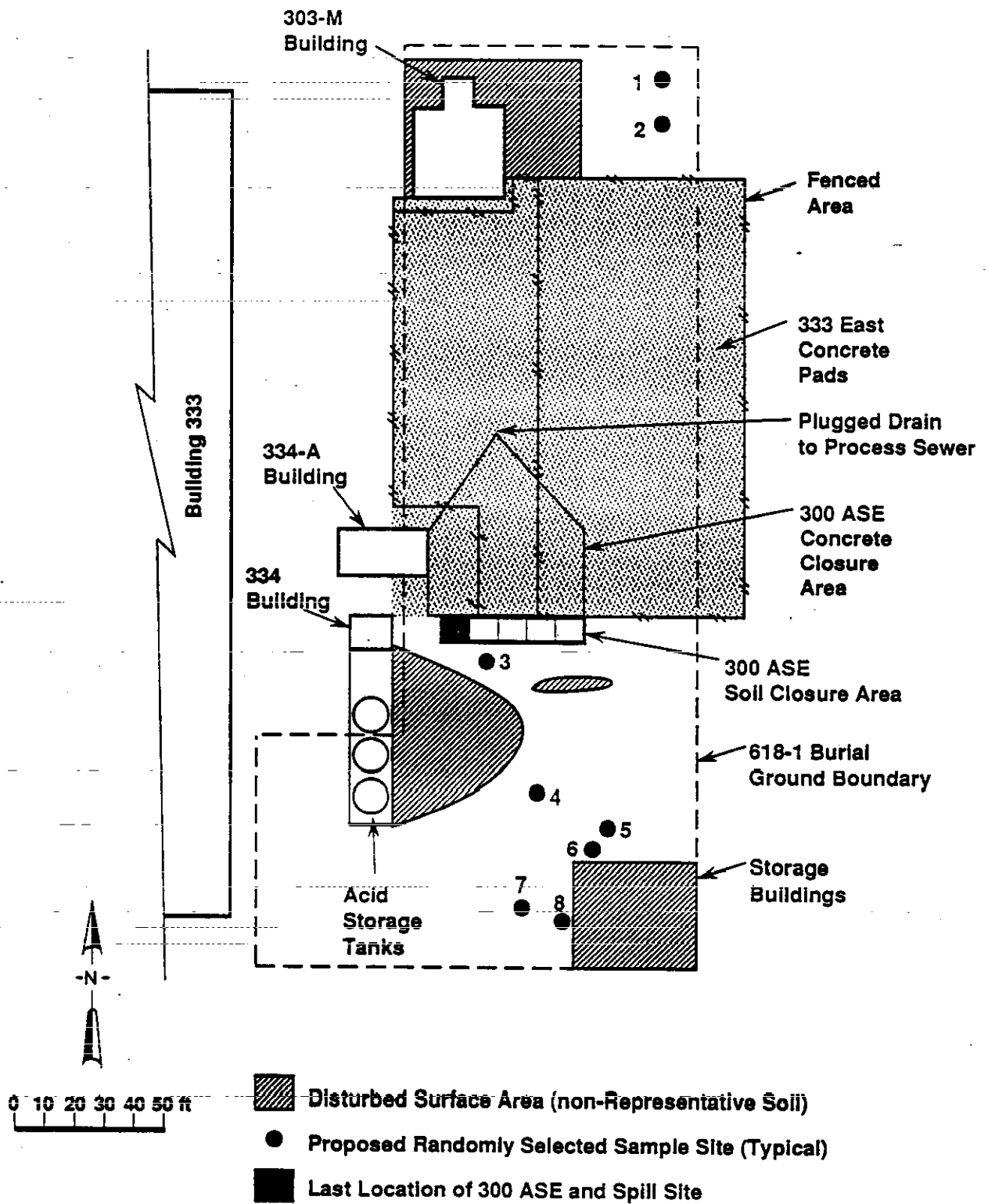
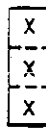
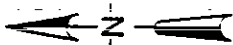
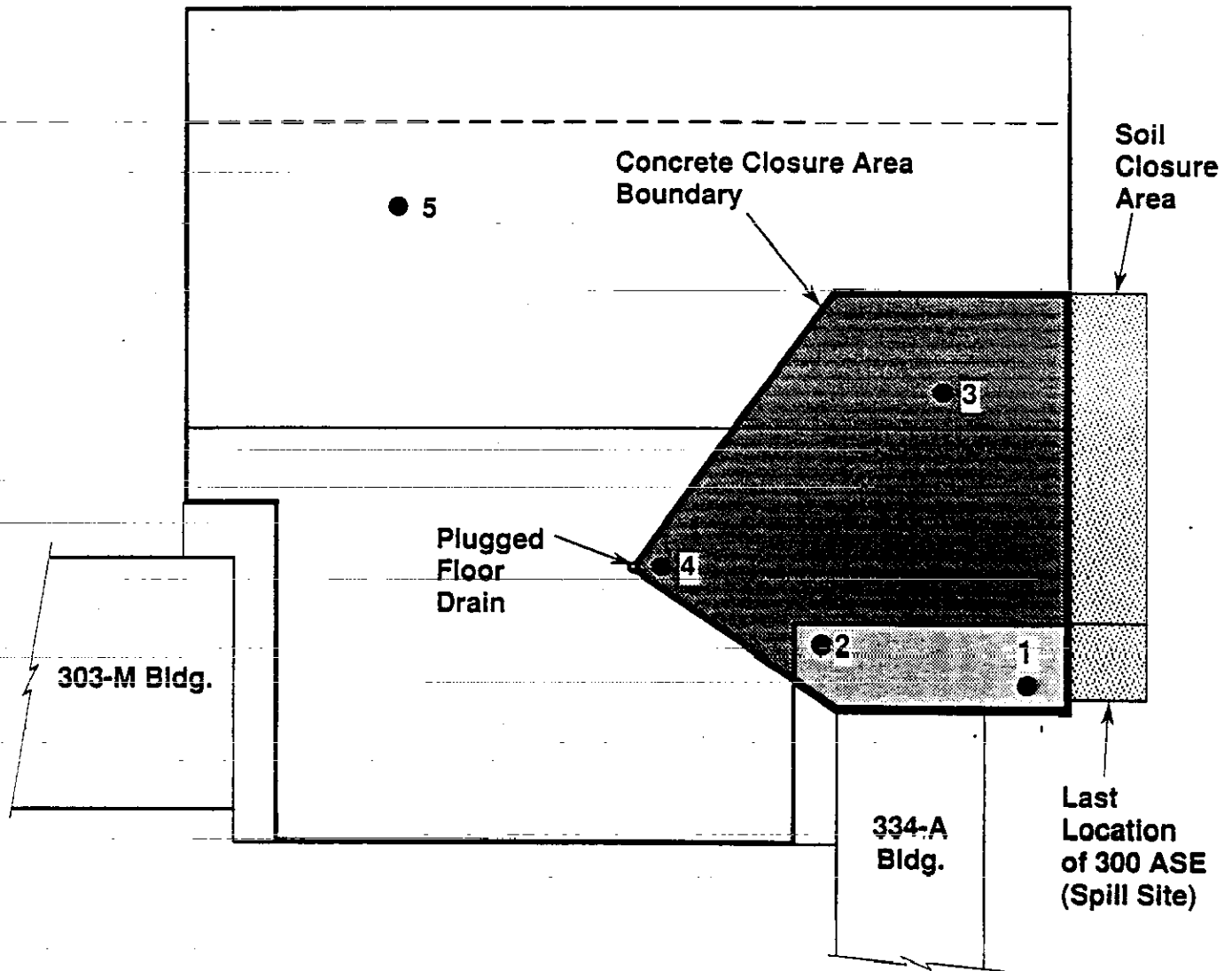


Figure 3-2. Soil Sampling Sites for the 300 Area Solvent Evaporator.

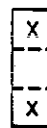


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Figure 3-3. Baseline Soil Sampling Sites for the 300 Area Solvent Evaporator.



Core No. 1



Core No. 2

Not To Scale

5 Core Reference Number

● Core Sample Locations

x Vertical Position of  
Sample Within Core

Core No. 3



Core No. 4



Core No. 5

Concrete  
Overlay:  
2 in. - 12 in.

Original  
Concrete: 4 in.  
(333 East Pad)

Figure 3-4. Concrete Sampling Sites for the 300 Area Solvent Evaporator.

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Table 3-3. Duration Schedule for Soil and Concrete Sampling<sup>a</sup>

Week	Activity
0	Receipt of Ecology's written authorization to perform sampling
1-6	Mobilization for sampling; deployment of field crews, implementation of analytical laboratory's statement of work, engage independent engineer contract, etc.
7-8	Collect and transport samples from the 300 ASE and baseline locations to the laboratory
9-19	Laboratory analysis of the samples (60 days) and verification of the laboratory report (21 days)
20-23	Review of analytical results and statistical analyses; telephone notification to Ecology (following the DOE-RL briefing)
24-28 <sup>b</sup>	Submittal to Ecology of the closure disposition and contaminant volumes (if any), based upon the soil and concrete sampling/analysis results
<sup>a</sup> Soil and concrete sampling and analysis may not be concurrent <sup>b</sup> Ecology/EPA acceptance of the closure disposition will constitute conclusion of the closure activities.	

schedule. It is anticipated that initiation of sampling and analysis and closure of the site, will be completed within 180 days after approval of the closure plan. Schedules for remedial action as part of the clean closure activities, or as part of the Remedial Investigation/Feasibility Study activities associated with Operable Unit 300-FF-2, will be provided to Ecology as amendments to this plan.

### 3.6 AMENDMENT OF PLAN

The original closure plan for the 300 ASE was submitted to Ecology in September 1985. This version of the closure plan has been revised to reflect the completion of the stated initial closure activities and notification to the regulating authority of the current site status. Amendment(s) to this plan regarding the results of soil and concrete sampling and analysis and impacts to the clean closure strategy will be provided to Ecology.

Amendment(s) to this plan may also be provided in the event that any CERCLA remediation activities are necessary. The DOE-RL will be responsible for all amendments to this plan.

### 3.7 CLOSURE HISTORY

Closure of the 300 ASE site began with suspension of solvent waste deliveries to the site in August 1985, and termination of the heating process and final shutdown of the facility in November 1985 (Table 3-1).

1  
2 3.8 SCHEDULE FOR TREATMENT, REMOVAL, AND  
3 DISPOSAL OF FINAL WASTE VOLUME  
4

5 Removal, solidification, and disposal of the final waste volume was  
6 initiated in November 1985, and completed in July 1986. The schedule of these  
7 activities has been summarized in Table 3-1. Following the evaluation of data  
8 obtained from the soil and concrete sampling and analysis plan, if needed, as  
9 part of the CERCLA process, a schedule for removal and disposal of any  
10 evaporator originated contaminants remaining in the soil and/or concrete will  
11 be prepared and provided to Ecology as an amendment to this plan.  
12  
13

14 3.9 CLOSURE COMPLETION AND EXTENSION OF  
15 TIME PERIOD  
16

17 It is required that final closure be completed within 180 days after  
18 receipt of the final volume of waste, or within 180 days after approval of the  
19 closure plan, whichever is later, unless an extension is granted. It is  
20 anticipated that the soil and concrete sampling/verification activities will  
21 be completed within 180 days after approval of this closure plan. If the  
22 evolution of unforeseen events could necessitate an extension of this time  
23 period, then an extension from Ecology would be requested.



## 4.0 CERTIFICATION OF CLOSURE

Within 60 days of final closure of the 300 ASE, the DOE-RL will submit to Ecology a certification of closure. This certification will be signed by both the DOE-RL and an independent professional engineer registered in the State of Washington, stating that the facility has been closed in accordance with the approved closure plan. The certification will be submitted by registered mail. Documentation supporting the closure certification will be retained and furnished to Ecology upon request. The DOE-RL will self-certify with the following document or a document similar to it:

"I, the undersigned, the owner and operator of the 300 Area Solvent Evaporator, hereby certify that I have reviewed the approved 300 Area Solvent Evaporator Closure Plan and, to the best of my information and belief, all closure activities were performed in accordance with the specifications identified in the approved closure plan. (Signature and date)."

Professional Engineer Closure Certification: The DOE-RL will engage an independent professional engineer registered in the State of Washington to certify that the facility has been closed in accordance with the approved closure plan. The DOE-RL will require the engineer to sign the following document or a document similar to it:

"I, the undersigned, an independent registered professional engineer, hereby certify that I have reviewed the approved Closure Plan for the 300 Area Solvent Evaporator and, to the best of my information and belief, all closure activities were performed in accordance with the specifications identified in the approved closure plan, (Signature, date, professional engineer license number, business address, and telephone number)."

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## 5.0 POST-CLOSURE

## 5.1 NOTICE IN DEED

If clean closure cannot be accomplished, within 60 days of the certification of closure of the 300 ASE site, the DOE-RL will, in accordance with the state regulations, sign, notarize, and file for recording, the following notice. The notice will be sent to the Auditor of Benton County, P.O. Box 470, Prosser, Washington, with instructions to record this notice in the General Index. This document is normally reviewed in property title searches.

## TO WHOM IT MAY CONCERN

The U.S. Department of Energy-Richland Operations Office, an operations office of the U.S. Department of Energy, which is a department of the United States Government, the undersigned, whose local address is the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby gives the following notice as required by 40 CFR 265.119(b) and WAC 173-303-610(10) whichever is applicable:

- (a) The United States of America is, and since April 1943, has been in possession in fee simple of the following described lands (legal description of the 300 ASE closure site).
- (b) The U.S. Department of Energy-Richland Operations Office, by operation of the 300 Area Solvent Evaporator, has disposed of hazardous and/or dangerous waste under the terms of regulations promulgated by the U.S. Environmental Protection Agency and Washington State Department of Ecology (whichever is applicable) at the above described land.
- (c) The future use of the above-described land is restricted under the terms of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is applicable).
- (d) Any and all future purchasers of the this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of wastes disposed on the above-described property.
- (e) The U.S. Department of Energy-Richland Operations Office has filed a survey plat with the Benton County Planning Department and with the U.S. Environmental Protection Agency Region 10 and Washington State Department of Ecology (whichever are applicable) showing the location and dimensions of the 300 Area Solvent Evaporator site and a record of the type, location, and quantity of waste treated.

1 5.2 CLOSURE COST ESTIMATE  
2  
3

4 It is DOE-RL's understanding that federal facilities are not required to  
5 comply with WAC 173-303-620. However, projections of anticipated closure  
6 costs will be provided annually during the closure activities (starting  
7 October 1993).

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## 6.0 PROCEDURES TO PREVENT HAZARDS

The procedures applicable to normal Hanford Site activities (including soil and concrete sampling) are described in the following sections.

### 6.1 SECURITY

Security is addressed in Chapter 1.0, Section 1.2.

### 6.2 INSPECTION SCHEDULE

Clean closure is anticipated; therefore, this section is not applicable to the 300 ASE. The alternative, if implemented, is to follow the CERCLA process (300-FF-2 Operable Unit) and the emergency remedial action may be an epoxy-asphalt cover with suitable engineered thickness to preclude any RCRA monitoring/inspection requirements.

### 6.3 DOCUMENTATION OF PREPAREDNESS AND PREVENTION REQUIREMENTS OR WAIVER

The Hanford Site normal emergency facilities/equipment are adequate for all emergencies, if needed. Figure 1-2 shows the close proximity of medical and fire station facilities. Section 6.5 addresses the relevant scenarios associated with closure activities and includes documentation requirements.

### 6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

No closure activities are anticipated beyond the collection of soil and concrete samples; therefore, this section is not applicable to the 300 ASE.

### 6.5 SPILLS AND DISCHARGES TO THE ENVIRONMENT

Because the facility no longer exists, there is no possibility of spills and discharges to the environment resulting from the 300 ASE. The only other types of impact to the environment from the 300 ASE are those associated with soil and concrete sampling activities, and there are no dangerous materials used in this effort. The following information is provided as an additional safety measure to cover unanticipated contingencies. The field team leader will be the responsible individual for modifying and implementing any additional safety measures.

## 6.5.1 Notifications

Three types of notifications are described in this section:

(1) emergency signals; (2) notification of emergency response organizations, and (3) notification of authorities.

6.5.1.1 Emergency Signals. Several communication systems exist on the Hanford Site to notify personnel of emergency incidents and to disseminate information about events affecting Hanford Site activities. Three of these systems are as follows:

- Priority message system (management bulletin)--a network of telefax machines used to transmit important messages rapidly across the Hanford Site
- The DOE-RL radio system--links the Hanford Patrol, Hanford Fire Department, safety, and engineering representatives at a network of base stations, mobile units, and portable radios
- Hanford Site emergency signals--emergency signals used to alert personnel in an emergency event are listed in Table 6-1.

Table 6-1. Hanford Site Emergency Signals.

Signal	Incident/Alarm Type	Response
Gong or bell	Fire	Nonprocess personnel will evacuate Process personnel will wait for directions
Steady siren	Evacuation	Get car keys if time permits and vacate building; report to staging area <sup>a</sup>
Wailing siren	Take cover	Seek shelter indoors Shut windows and doors Await instructions
Ringling bell	CAM <sup>b</sup> alarm	Evacuate immediate area Call for help Remain in one location
CRASH alarm	Emergency communications	Pick up phone and listen Relay message to building emergency director
<sup>a</sup> Area where facility personnel gather following notification of incident. <sup>b</sup> Continuous air monitor.		

6.5.1.2 Notification of Emergency Response Organizations. The building emergency director will be responsible for initially assessing any facility emergency situation. Notification of the Hanford Site emergency response organizations will be carried out as follows.

- If the situation requires assistance from the Hanford Fire Department, ambulance, or the Hanford Patrol, notification of the Patrol Operations Center will be made via the Hanford emergency response number (811).
- For lesser emergencies necessitating assistance from outside the facility (but not requiring fire, ambulance, or patrol personnel) notification will be given to the emergency duty officer at the Patrol Operations Center business number (373-3800).
- In the case of a relatively minor abnormal occurrence, the situation will be handled by facility personnel (the building emergency director and line management).

6.5.1.3 Notification of Authorities. Notification of the DOE-RL, Ecology, and the National Response Center will be carried out as follows.

- The building emergency director or line management will document all emergencies on an Event Fact Sheet (Figure 6-1), which must be completed within 24 hours. The Event Fact Sheet will be used to provide Westinghouse Hanford management with facts about an unplanned event and to disseminate information to those responsible for preventing recurrence of similar events. The DOE-RL will be notified by Westinghouse Hanford line management or the assigned overview organization depending on the consequences of the event. A copy of the Event Fact Sheet will be retained by the DOE/RL.
- The Patrol Operations Center will immediately notify the DOE-RL of all emergency incidents (fires, explosions, releases, etc.) reported via the Hanford Site emergency number (811).
- In the case of any release of dangerous waste, the building emergency director will immediately notify Westinghouse Hanford Environmental Protection. All releases of dangerous waste to the environment will be reported immediately to the DOE-RL by Environmental Protection. The DOE-RL then will notify Ecology of the release.
- In addition, if a spill exceeds the reportable quantities established under CERCLA, according to 40 CFR 302, the DOE-RL will notify the National Response Center at (800) 424-8802.
- The DOE-RL report to Ecology and the National Response Center will contain the following information:
  - Name and telephone number of reporter
  - Name and address of facility
  - Time and type of incident

- 1 - Name and quantity of material(s) involved to the extent known  
2 - Extent of injuries, if any  
3 - Possible hazards to human health and the environment outside the  
4 facility  
5 - Actions taken to mitigate the situation.

- 6  
7 • All environmental releases of hazardous materials, including those  
8 that do not exceed a CERCLA or Ecology reporting limit, will be  
9 included in a monthly spill report. Facility managers provide  
10 information on environmental hazardous material spills to  
11 Environmental Protection. Environmental Protection compiles the  
12 monthly spill report for submittal to DOE-RL.  
13  
14 • All spills or releases that occur during transportation will be  
15 reported by the transporter to the DOE-RL and Ecology. In addition, a  
16 written report will be submitted to:

17  
18 Director, Office of Hazardous Material Regulations  
19 Materials Transport Bureau  
20 Department of Transportation  
21 Washington, DC 20990.  
22  
23

#### 24 6.5.2 Mitigation and Control

25

26 Any waste remediation will be addressed as part of the 300-FF-2 Operable  
27 Unit, therefore, this section does not apply.

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Contractor:		EVENT FACT SHEET		Page 1 of _____
1. Title _____		4. Number _____		
2. Reporting Organization _____		5. Rev. _____		
3. Division/Department/Project _____		6. Date of Event/Time _____ / _____		
<b>7. Event Identification</b> A) Location of Event: B) Plant/Facility Status: <input type="checkbox"/> Event Type:				
<b>8. Apparent Cause(s) of Event</b> <input type="checkbox"/> Design <input type="checkbox"/> Material <input type="checkbox"/> Procedure <input type="checkbox"/> Personnel Error <input type="checkbox"/> Administrative Control <input type="checkbox"/> Other				
<b>9. Description of Event</b>				
<b>10. Consequences of Event</b>				
<b>11. Actions Taken (A) or Planned (B)</b>				
<b>12. Tentative Disposition</b> <input type="checkbox"/> Event meets criteria for a UOR <input type="checkbox"/> Event meets criteria for a Critique <input type="checkbox"/> Undetermined: Revised EPS will be issued in 3 working days <input type="checkbox"/> Above criteria not met: no further report		<b>13. Signatures</b> Originator Date _____ Approved Date _____ AOC/UCM Review Official _____ Review Date _____		

Figure 6-1. Event Fact Sheet.

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## 7.0 CONTINGENCY PLAN

1  
2  
3  
4 The 300 ASE sampling plan and the *Environmental Investigations and Site*  
5 *Characterization Manual* (WHC 1989) contain contingency plan information for  
6 specific field sampling operations.  
7

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## 8.0 PERSONNEL TRAINING

All personnel involved with the closure activities of the 300-ASE will receive a minimum level of dangerous waste training.

- Managers and supervisors (M & S) are responsible for supervising, coordinating, and directing the closure activities and personnel.
- Nuclear Process Operators and Decommissioning and Decontamination workers (NPO) are responsible for sampling, packaging, and handling of dangerous waste, nonradioactive, and radioactive material.
- Health Physics Technicians (HPT) are responsible for surveying for radiological and dangerous waste contamination.
- Crafts (CR) personnel are responsible for specialized work. The various crafts include carpenters, electricians, ironworkers/riggers, heavy equipment operators, crane operators, millwrights, pipefitters, and painters.

In addition to the personnel mentioned, any person entering a TSD unit during closure must have the 40 hour hazardous workers training.

Table 8-1 contains a matrix that relates job categories to the individual training course. Appendix N contains brief descriptions of the training courses, including descriptions of the target audience, instructional technique, evaluation method, length of course, and frequency of retraining.

Table 8-1. Company-General Training Matrix.

Course title	Type	Target/Audience			
		MS	NPO	HPT	CR
Generator Hazards Safety Training	I	X	X	X	X
Hazardous Waste Worker Safety Training	I	X	X	X	X
Hazardous Waste Worker Safety Training, Refresher	C	X	X	X	X
Hazardous Materials/Waste Job Specific Training	I	X	X	X	X
Scott SKAPAK <sup>®</sup> MSA PAPR	C	X	X	X	X
Self-Contained Breathing Apparatus (SCBA) Training (optional)	C	X	X	X	X
Radiation Safety Training	C	X	X	X	X
On-the-Job Training	C	X	X	X	X
Cardiopulmonary Resuscitation	C	X	X	X	X
Noise Control (optional)	C	X	X	X	X

C = continuing course.  
I = introductory course.  
X = required course.

<sup>1</sup> Scott SKAPAK is a trademark of Figgie International, Incorporated.

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- 1| Title: Generator Hazards Safety Training
- 2| Description: Provides the dangerous material/waste worker with the fundamentals for safe use and disposal of dangerous materials.
- 3| Target Audience: Dangerous material and waste workers
- 4| Technique: Classroom
- 5| Evaluation: Written test
- 6| Length: 4 hours
- 7| Frequency: 24 months
- 8
- 
- 9
- 10| Title: Hazardous Waste Worker Safety Training
- 11| Description: Provides the dangerous waste worker with the fundamentals of safety when working with dangerous waste.
- 12| Note: This course fulfills training requirements of 29 CFR 1910.120 requiring dangerous waste training of workers at all treatment, storage, and/or disposal facilities regulated under RCRA.
- 13| Target Audience: Dangerous material and waste workers
- 14| Technique: Classroom and on-the-job training
- 15| Evaluation: Written test
- 16| Length: 24 hours
- 17| Frequency: Not applicable
- 18|
-

1 | Title: Hazardous Waste Worker Safety Training Refresher

2 | Description: Provides the dangerous waste worker with a refresher in the fundamentals of safety when working with dangerous waste.

3 | Note: This course fulfills training requirements of 29 CFR 1910.120 requiring dangerous waste training of workers at all treatment, storage, and/or disposal facilities regulated under RCRA.

4 | Target Audience: Dangerous material and waste workers

5 | Technique: Classroom

6 | Evaluation: Written test

7 | Length: 8 hours

8 | Frequency: 12 months

9

10

11 | Title: Hazardous Material/Waste Job-Specific Training

12 | Description: Provides job-specific dangerous material/waste information. Two checklists may be obtained from safety training to help the supervisor/manager through this session with each employee.

13 | Note: Not a classroom presentation--supervisor conducts this exercise with each employee using the checklists.

14 | Target Audience: Employees who complete generator hazards safety training

15 | Technique: On-the-job training

16 | Evaluation: On-the-job training checklist

17 | Length: Average - 2 hours

18 | Frequency: 12 months

- 1 | Title: Scott SKAPAK MSA PAPR
- 2 | Description: This class is designed to instruct employees in the proper use of the Scott "SKAPAK" for entry, exit or work in conditions immediately dangerous to life and health and to instruct employees to recognize and handle emergencies. This class also includes instructions in the use of MSA PAPR.
- 3 | Target Audience: General, Safety, QA, OPS/OPRS, Management, Maintenance Engineering
- 4 | Technique: Classroom
- 5 | Evaluation: Practical exam
- 6 | Length: Approximately 2 hours
- 7 | Frequency: 12 months
- 8
- 
- 9

- 10 | Title: Self-Contained Breathing Apparatus (SCBA) Annual Qualification
- 11 | Description: Provides instructions in the proper use of a pressure-demand respirator in which breathing air is supplied from a cylinder carried on the user's back. The SCBA are typically used for emergency response situations in an atmosphere that is immediately dangerous to life or health.
- 12 | Target Audience: General, Safety, OPS/OPRS, Maintenance
- 13 | Technique: Taught in a classroom using a slide projector and overhead
- 14 | Evaluation: Written and practical test
- 15 | Length: Approximately 4 hours
- 16 | Frequency: 12 months

17



- 9413293.2011
- 1 | Title: Radiation Safety Training
- 2 | Description: A practical dress/undress demonstration is also required. Instructs radiation workers in the fundamentals of radiation protection and the proper procedures for monitoring exposures (ALARA). Training includes knowledge of the acute and chronic effects of exposure to radiation risks associated with occupational radiation exposure, mode of exposure, protective measures, instrumentation, monitoring programs, contamination control, personnel decontamination, warning signs and alarms, and responsibilities of employees and managers.
- 3 | Target Audience: Radiation workers as defined in WHC-CM-4-10
- 4 | Technique: Taught in a classroom using a white board, appropriate audio/visual equipment
- 5 | Evaluation: Written exam and practical dress/undress
- 6 | Length: Approximately 7 hours
- 7 | Frequency: 24 months (Retraining under Course Number 020003)
- 8
- 
- 9

- 10 | Title: On-The-Job Training
- 11 | Description: On-the-job training session under the supervision of an experienced person before full responsibilities may be assumed. In addition, all personnel on the hazardous waste site are required to have reviewed this Waste Sampling and Analysis Plan.
- 12 | Target Audience: Dangerous Material and Waste Workers
- 13 | Technique: Classroom and on-the-job training
- 14 | Evaluation: Practical exercise and on-the-job training checklist
- 15 | Length: 40 hours
- 16 | Frequency: 12 months

- 1| Title: Cardiopulmonary Resuscitation (CPR)  
2| Description: Provide cardiopulmonary Resuscitation training to  
the American Heart Association standards.  
3| Target Audience: All employees  
4| Technique: Classroom and active participation.  
5| Evaluation: Practical exam and written test.  
6| Length: 4 hours  
7| Frequency: 24 months (recertification)

8

9

- 10| Title: Noise Control (Noise-Hearing Conservation)  
11| Description: Provide employees with information conducive to  
hearing conservation. Supervisors and employees  
responsibility, exposure limits, hearing  
conservation requirements, protection devices,  
diagnosis of noise, induced hearing loss.  
12| Target Audience: All employees exposed to an 8 hour time weighted  
average sound level of 85 dBA or greater.  
13| Technique: Classroom  
14| Evaluation: None  
15| Length: Approximately 1 hour  
16| Frequency: 12 months

17

9443293.2012

## 9.0 OTHER RELEVANT LAWS

As discussed in Sections 3.3 and 3.5, the CERCLA process could become significant in remediating this RCRA site. Applicable RCRA requirements will be included within the CERCLA processes, if clean closure is not possible.

This section provides a summary of the regulatory review performed to assist Ecology in determining that the 300 ASE has met its obligations with respect to other federal or state laws. The major environmental laws evaluated include the following:

- The Clean Air Act of 1977, as amended
- The Clean Water Act of 1977, as amended
- The Coastal Zone Management Act of 1972, as amended
- The Endangered Species Act of 1973, as amended
- The Fish and Wildlife Coordination Act of 1934, as amended
- The National Historic Preservation Act of 1966, as amended
- The Wild and Scenic Rivers Act of 1968, as amended.

In addition, a summary of other requirements that may apply is provided. Full references for each of these acts are included in Chapter 10.0.

## 9.1 THE CLEAN AIR ACT OF 1977

No active processing will occur at the 300 ASE to provide routine emissions. No radioactive material will be stored at the facility. Storage will involve sealed dangerous waste with possibly some occasional sampling activities. Other than a catastrophic event, no upset conditions internal or external to the facility would result in release concentrations outside the facility exceeding levels the Occupational Safety and Health Administration (OSHA) (OSHA 1989) defines as immediately dangerous to life and health. Airborne releases from upset conditions would only continue until recovery actions were taken. Based on this scenario, airborne emissions from the facility will not include contaminants at concentrations or in sufficient amounts that currently require an air quality permit from any agency.

## 9.2 THE CLEAN WATER ACT OF 1977

Because the 300 ASE no longer exists, operation of the 300 ASE can no longer result in the discharge of any liquid effluents that would require a National Pollutant Discharge Elimination System (NPDES) permit; therefore, no permits or reviews pursuant to the *Clean Water Act of 1977* are applicable.

## 9.3 THE COASTAL ZONE MANAGEMENT ACT OF 1972

The 300 ASE site is not located in a coastal zone or shoreline area as defined by this statute; therefore, no permits or reviews pursuant to the *Coastal Zone Management Act of 1982* are applicable.

1 9.4 THE ENDANGERED SPECIES ACT OF 1973

2  
3 The site for the 300 ASE cannot be considered an undisturbed area or a  
4 major habitat for native plant and animal species. Also, this area  
5 constitutes a very small fraction of the Hanford Site and, hence, would not  
6 play a significant role in the ecology of the Hanford Site. No listed or  
7 proposed endangered or threatened species or their habitats are expected to be  
8 affected by 300 ASE activities.  
9

10  
11 9.5 THE FISH AND WILDLIFE COORDINATION  
12 ACT OF 1934  
13

14 The 300 ASE will not involve the impoundment, diversion, or other control  
15 or modification of any body of water; therefore, no permits or reviews  
16 pursuant to the *Fish and Wildlife Coordination Act of 1934* are applicable.  
17

18  
19 9.6 THE NATIONAL HISTORIC PRESERVATION  
20 ACT OF 1966  
21

22 The 300 ASE affects no areas that are eligible for nomination to the  
23 National Register of Historic Places. In addition, the area was reviewed for  
24 cultural resources.  
25

26 Sites used as material 'borrow areas' for the 300 ASE have been reviewed  
27 for the presence of archaeological resources in accordance with regulations  
28 issued pursuant to, or other requirements of, the *American Antiquities*  
29 *Preservation Act of 1906*; the *American Indian Religious Freedom Act of 1978*;  
30 the *Historic Sites, Buildings and Antiquities Act of 1935*; the *Archaeological*  
31 *and Historic Preservation Act of 1960*; and the *Archaeological Resources*  
32 *Protection Act of 1979*. No known cultural resource impacts have occurred from  
33 300 ASE activities.  
34

35  
36 9.7 THE WILD AND SCENIC RIVERS ACT OF 1968  
37

38 The 300 ASE site does not affect any rivers presently designated under  
39 the *Wild and Scenic Rivers Act of 1968*.  
40

41  
42 9.8 OTHER REQUIREMENTS  
43

44 The application of insecticides and herbicides on or in the immediate  
45 vicinity of the 300 ASE will be conducted in compliance with the *Federal*  
46 *Insecticide, Fungicide, and Rodenticide Act of 1975*, the *Toxic Substances*  
47 *Control Act of 1976*, and the applicable provisions of the *Water Quality*  
48 *Standards for Surface Waters of the State of Washington* (Ecology 1988).

## 10.0 REFERENCES

- 1  
2  
3  
4 *American Antiquities Preservation Act*, 1906, 16 USC 432.  
5  
6 *American Chemical Society*, 1983, *Principles of Environmental Analysis*,  
7 *Analytical Chemistry*, Vol. 55, pp. 2210-2218.y  
8  
9 *American Indian Religious Freedom Act*, 1978, Public Law 95-341, 92  
10 Stat. 469, 42 USC 1996.  
11  
12 *Archaeological Resources Protection Act of 1979*, Public Law 96-95,  
13 93 Stat. 721, 16 USC 470aa.  
14  
15 *Clean Air Act of 1977*, as amended, Public Law 95-95, 91 Stat. 685,  
16 42 USC 7401.  
17  
18 *Clean Water Act of 1977*, as amended, Public Law 95-217, 92 Stat. 1566,  
19 33 USC 1251.  
20  
21 *Coastal Zone Management Act of 1972*, as amended, Public Law 92-583,  
22 86 Stat. 1280, 16 USC 1451 et seq.  
23  
24 *Comprehensive Environmental Response, Compensation and Liability Act of*  
25 *1980*, as amended, Public Law 96-510, 94 Stat. 2767, 42 USC 9601  
26 et seq.  
27  
28 DOT, 1988, *Shipping Container Specification*, Title 49, Code of Federal  
29 Regulations, Part 178, U.S. Department of Transportation,  
30 Washington, D.C.  
31  
32 Ecology, 1988, *Water Quality Standards for Surface Water of the State of*  
33 *Washington*, WAC 173-201, Washington State Department of Ecology,  
34 Olympia, Washington.  
35  
36 Ecology, 1989, *Dangerous Waste Regulations*, WAC 173-303, Washington State  
37 Department of Ecology, Olympia, Washington.  
38  
39 Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and*  
40 *Consent Order*, Washington State Department of Ecology,  
41 U.S. Environmental Protection Agency, U.S. Department of Energy,  
42 Olympia, Washington.  
43  
44 *Endangered Species Act of 1973*, as amended, Public Law 93-205, 87 Stat.  
45 884, 16 USC 1531, et seq.  
46  
47 EPA, 1982, *RCRA (Resource Conservation and Recover Act) Guidance*  
48 *Document: Landfill Design, Liner Systems and Final Cover*,  
49 PB87-157657, National Technical Information Service,  
50 U.S. Environmental Protection Agency, Springfield, Virginia.

- 1 EPA, 1989, *Environmental Protection Agency*, Code of Federal Regulations,  
2 Title 40, Parts 1-399, as amended, U.S. Environmental Protection  
3 Agency, Washington, D.C.  
4  
5 EPA, 1989a, *Risk Assessment Guidance for Superfund: Human Health*  
6 *Evaluation Manual, Part A, Chapter 6, Exposure Assessment*,  
7 U.S. Environmental Protection Agency, Washington, D.C.  
8  
9 EPA, 1989b, *Health Effects Assessment Summary Tables*, U.S. Environmental  
10 Protection Agency, Washington, D.C.  
11  
12 EPA, 1991, *Integrated Risk Information System (IRIS)*, U.S. Environmental  
13 Protection Agency, Washington, D.C.  
14  
15 *Federal Insecticide, Fungicide, and Rodenticide Act*, 1975, as amended,  
16 Public Law 92-516, 86 Stat. 973, 7 USC 136 et seq.  
17  
18 *Fish and Wildlife Coordination Act of 1934*, as amended, c. 55 S1,  
19 8 Stat. 401, 16 USC 661.  
20  
21 *Historic Sites, Buildings and Antiquities Act of 1935*, 49 Stat. 666,  
22 16 USC 461-467.  
23  
24 *National Historic Preservation Act of 1966*, as amended, Public Law  
25 89-665, 80 Stat. 915-919, 16 USC 470 et seq.  
26  
27 OSHA, 1989, *Hazardous Waste Operations and Emergency Response*, Title 29  
28 Code of Federal Regulations, Part 1910.120, as amended, *Federal*  
29 *Register*, 54 FR 12792, March 28, 1989, Occupational Safety and Health  
30 Administration, Washington, DC.  
31  
32 RTECS, 1987, *Registry of Toxic Effects of Chemical Substances 1985-86 Edition*  
33 *Users Guide*, as amended, U.S. Department of Health and Human Services,  
34 National Institute for Occupational Safety and Health, Washington, D.C.  
35  
36 *Resource Conservation and Recovery Act of 1976*, as amended, Public Law  
37 94-580, 90 Stat. 2795, 42 USC 6901 et seq.  
38  
39 Sax, N.I. and Lewis, R.J., 1987, *Hawley's Condensed Chemical Dictionary*,  
40 11th ed., Van Nostrand Reinhold Company, New York, p. 806.  
41  
42 *Toxic Substances Control Act of 1976*, Public Law 94-469, 90 Stat. 2003,  
43 15 USC 2601 et seq.  
44  
45 WHC, 1989, *Environmental Investigation and Site Characterization Manual*  
46 (EII), WHC-CM-7-7, Westinghouse Hanford Company, Richland,  
47 Washington.  
48  
49 *Wild and Scenic Rivers Act of 1968*, as amended, Public Law 90-542, 82  
50 Stat. 906, 16 USC 1271.

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APPENDIX A

----- PART A APPLICATION

8107-5676  
9/13/93 2018

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Part A Form 1

3 Pages

Part A Form 3 (includes 3 figures)

10 Pages

6102-5626-46  
9/4/2019

FORM

1

State of  
Washington  
Department  
of Ecology

WASHINGTON STATE

## DANGEROUS WASTE PERMIT GENERAL INFORMATION

(Read "Part I Instructions" before starting)

L EPA/STATE LD. NUMBER

WA 1718910101819017

## II. NAME OF FACILITY

U.S. DEPARTMENT OF ENERGY - HANFORD SITE

## III. FACILITY CONTACT

A. NAME &amp; TITLE (Last, First, &amp; Middle)

LAWRENCE, MICHAEL J., MANAGER

B. PHONE (area code &amp; no.)

509 | 376 | 7395

## IV. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

P.O. BOX 550

B. CITY OR TOWN

RICHLAND

C. STATE D. ZIP CODE

WA 99352

## V. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

HANFORD SITE

B. COUNTY NAME

BENTON

C. CITY OR TOWN

RICHLAND

D. STATE

WA

E. ZIP CODE

99352

F. COUNTY CODE

005

## VI. SIC CODES (4-digit, in order of priority)

A. FIRST

19711 NATIONAL SECURITY

B. SECOND

18922

NUCLEAR NONCOMMERCIAL DEVELOPMENT  
AND EDUCATION

C. THIRD

19611 ADMINISTRATION AND GENERAL  
ECONOMICS PROGRAM

D. FOURTH

14911

STEAM-ELECTRIC GENERATION

## VII. OPERATOR INFORMATION

A. NAME

(DOE - RI)

DEPARTMENT OF ENERGY - RICHLAND OPERATIONS

WESTINGHOUSE HANFORD COMPANY (WHC)

B. Is the radio listed in  
Part VI-A also the  
owner's?☒ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter and the number 1 if "Other", identify.)

F - FEDERAL  
S - STATE  
P - PRIVATE  
U - PUBLIC (other than Federal or State)  
O - OTHER (identify)

F

D. PHONE (area code &amp; no.)

509 | 376 | 7395

E. STREET OR P.O. BOX

PO BOX 550 / PO BOX 1970

509 376 7803

F. CITY OR TOWN

RICHLAND

G. STATE

WA

H. ZIP CODE

99352

## VIII. INDIAN LAND

Is the facility located on Indian lands?

☐ YES ☒ NO\*\*DOE-RL: OWNER/CO-OPERATOR; WHC: CO-OPERATOR FOR CERTAIN UNITS ON THE HANFORD SITE.  
COMPLETE BACK PAGE

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**IX. MAP**

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

**X. NATURE OF BUSINESS (provide a brief description)**

- o NATIONAL DEFENSE NUCLEAR MATERIAL PRODUCTION
- o ENERGY RESEARCH AND TECHNOLOGY DEVELOPMENT
- o DEFENSE NUCLEAR WASTE MANAGEMENT
- o BYPRODUCT STEAM, SOLD FOR ELECTRIC POWER GENERATION

AND SIC 15: BUILDING CONSTRUCTION - GENERAL CONTRACTORS AND OPERATIVE BUILDERS

**XI. CERTIFICATION (see instructions)**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

**A. NAME & OFFICIAL TITLE (Type or print)**

SEE ATTACHMENT

**B. SIGNATURE****C. DATE SIGNED**

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WA7890008967

## FORM 1

## DANGEROUS WASTE PERMIT GENERAL INFORMATION

XI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Michael J. Lawrence  
Michael J. Lawrence  
Manager, Richland Operations  
United States Department of Energy

5-19-88  
Date

W. M. Jacob  
William M. Jacob  
President  
Westinghouse Hanford Company  
Co-operator

5/13/88  
Date

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PLEASE PRINT OR TYPE IN ALL INFORMATION REQUESTED  
 (Provide dates and times in full form, i.e., 12/30/1989/10:00)

<b>FORM 3</b>	DANGEROUS WASTE PERMIT APPLICATION	EPA/STATE I.D. NUMBER <div style="border: 1px solid black; padding: 2px; display: inline-block;">           WA 7 8 9 0 0 0 8 9 6 7         </div>
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FOR OFFICIAL USE ONLY		COMMITTEE
APPLICATION NUMBER	DATE RECEIVED	

**II. FIRST OR REVISED APPLICATION**

Please check "1" in the appropriate box at A or B below (check one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already have your facility's EPA/STATE I.D. Number, or if this is a revised application, enter your facility's EPA/STATE I.D. Number in Section I above.

A. FIRST APPLICATION (check one "1" below and complete and appropriate items)		B. REVISED APPLICATION (check one "1" below and complete Section I above)											
<input type="checkbox"/> 1. EXISTING FACILITY (This includes any extension of "existing" facility. Complete items below.)  * <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>MO</td><td>DAY</td><td>YEAR</td></tr> <tr><td></td><td></td><td>7/15</td></tr> </table> FOR EXISTING FACILITIES, PROVIDE THE DATE (MO, DAY, & YEAR) OPERATION BEGAN OR THE DATE CONSTRUCTION COMPLETED (MO, DAY, & YEAR) ON THE LINE	MO	DAY	YEAR			7/15	<input type="checkbox"/> 2. NEW FACILITY (Facilities under construction)  <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>MO</td><td>DAY</td><td>YEAR</td></tr> <tr><td></td><td></td><td></td></tr> </table> FOR NEW FACILITIES, PROVIDE THE DATE (MO, DAY, & YEAR) OPERATION BEGAN OR IS EXPECTED TO BEGIN	MO	DAY	YEAR			
MO	DAY	YEAR											
		7/15											
MO	DAY	YEAR											
<input checked="" type="checkbox"/> 1. FACILITY HAS AN INTERIM STATUS PERMIT	<input type="checkbox"/> 2. FACILITY HAS A FINAL PERMIT												

### III. PROCESSES — CODES AND DESIGN CAPACITIES

**A. PROCESS CODES** — Enter the code from the list of process codes below that best describes each operation to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not contained in the list of codes below, then describe the process (including its design capacity) in the space provided on the Section B-C.

**B. PROCESS DESIGN CAPACITY** — For each code entered in Section A enter the capacity of the process.

1. AMOUNT — Enter the amount.  
 2. UNIT OF MEASURE — For each amount entered in Section B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Give the units of measure that are listed below entered in order.

PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage			Treatment		
CONTAINER (drum, drum, etc.)	301	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	302	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	303	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	304	GALLONS OR LITERS	OTHER (Use for processes, chemical, physical or biological treatment processes not entering in listed, surface impoundments or incinerators. Describe the processes in the space provided Section B-C.)	T04	GALLONS PER DAY OR LITERS PER DAY
Disposal					
INJECTION WELL	D00	GALLONS OR LITERS			
LANDFILL	D01	ACRE-FOOT (This measure may be used only when used as a unit of volume) OR HECTARE-METER			
LAND APPLICATION	D02	ACRES OR HECTARES			
OCEAN DISPOSAL	D03	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D04	GALLONS OR LITERS			

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	L	ACRE-FOOT	A
LITERS	L	TONS PER HOUR	T	HECTARE-METER	H
CUBIC YARDS	Y	METRIC TONS PER HOUR	M	ACRES	S
CUBIC METERS	C	GALLONS PER HOUR	H	HECTARES	G
GALLONS PER DAY	U	LITERS PER HOUR	R		

**EXAMPLE FOR COMPLETING SECTION III** (shown in two numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

LINE NO.	A. PRO-CESS CODE	B. PROCESS DESIGN CAPACITY			FOR OFFICIAL USE ONLY	LINE NO.	A. PRO-CESS CODE	B. PROCESS DESIGN CAPACITY			FOR OFFICIAL USE ONLY
		1. AMOUNT (numeric)	2. UNIT OF MEASURE (code)	3. UNIT OF MEASURE (code)				1. AMOUNT (numeric)	2. UNIT OF MEASURE (code)	3. UNIT OF MEASURE (code)	
X-1	S 0 2	600	G			5					
X-2	T 0 1	20	E			6					
1	T 0 1	220	U			7					
2	S 0 1	220	G			8					
* Information concerning the date of initial operation of this unit is not available.											
3											
4						10					

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## II. PROCESSES (continued)

SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "004") FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

**T01, S01** - The 300 Area Solvent Evaporator was a treatment tank that was used to treat radioactively contaminated spent solvents. These solvents were generated in the fuel fabrication process at the 300 Area. The solvents consisted mainly of spent trichloroethylene, perchloroethylene, 1,1,1-trichloroethane and an ethyl acetate-bromine solution. Non-radioactive paint shop solvents that were potentially treated include methyl ethyl ketone, methylene chloride and petroleum naphtha. Treatment of the wastes occurred by evaporation in a Brooks Load Luger tank with steam coils located on the side of the tank (T01). The unit was used to treat approximately 600 gallons of dangerous wastes per year. This unit has not received dangerous wastes since November 1985 and the site will be closed under interim status.

A portion of the open air concrete pad adjacent to the 334-A Building (333 East Pad) was used periodically for storage of the Solvent Evaporator and radioactively contaminated spent solvents in DOT-specification 55 gallon steel drums (S01). The drums were temporarily stored on the concrete pad north of the Solvent Evaporator sites until the waste solvents were placed in the Solvent Evaporator. No part of the overlying concrete that was placed above most of the 333 East Pad in 1984 was used for storage or treatment of the 300 Area Solvent Evaporator wastes.

## IV. DESCRIPTION OF DANGEROUS WASTES

**A. DANGEROUS WASTE NUMBER** - Enter the four digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.

**B. ESTIMATED ANNUAL QUANTITY** - For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

**C. UNIT OF MEASURE** - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	5	KILOGRAMS	K
TONS		METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

## D. PROCESSES

## 1. PROCESS CODES:

For listed dangerous wastes: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section II to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section II to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

Notes: Four spaces are provided for entering process codes, if more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

## 2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

**NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER** - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

- Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
- In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste, in column B(2) or that has error "included with above" and make no other entries on that line.
- Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

**EXAMPLE FOR COMPLETING SECTION IV (shown in the numbers X-1, X-2, X-3, and X-4 below)** - A facility will treat and dispose of an estimated 900 pounds per year of organic solvents from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 100 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and process will be in a landfill.

LINE	A. DANGEROUS WASTE NO. (Chapter 173-303)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (other codes)	D. PROCESSES	
				1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 3 4	900	P	T 0 3 D 3 0	
X-2	D 0 0 2	100	P	T 0 3 D 3 0	
X-3	D 0 0 1	100	P	T 0 3 D 3 0	
X-4	D 0 0 2			T 0 3 D 3 0	included with above

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Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 25 wastes to list.

IV. DESCRIPTION OF DANGEROUS WASTES (continued)													
D. PROCESSES													
1. PROCESS CODES (enter)													
2. PROCESS DESCRIPTION (if a waste is not entered in (1) (2))													
3. PROCESS CODES (enter)													
4. PROCESS DESCRIPTION (if a waste is not entered in (3) (4))													
5. PROCESS CODES (enter)													
6. PROCESS DESCRIPTION (if a waste is not entered in (5) (6))													
7. PROCESS CODES (enter)													
8. PROCESS DESCRIPTION (if a waste is not entered in (7) (8))													
9. PROCESS CODES (enter)													
10. PROCESS DESCRIPTION (if a waste is not entered in (9) (10))													
11. PROCESS CODES (enter)													
12. PROCESS DESCRIPTION (if a waste is not entered in (11) (12))													
13. PROCESS CODES (enter)													
14. PROCESS DESCRIPTION (if a waste is not entered in (13) (14))													
15. PROCESS CODES (enter)													
16. PROCESS DESCRIPTION (if a waste is not entered in (15) (16))													
17. PROCESS CODES (enter)													
18. PROCESS DESCRIPTION (if a waste is not entered in (17) (18))													
19. PROCESS CODES (enter)													
20. PROCESS DESCRIPTION (if a waste is not entered in (19) (20))													
21. PROCESS CODES (enter)													
22. PROCESS DESCRIPTION (if a waste is not entered in (21) (22))													
23. PROCESS CODES (enter)													
24. PROCESS DESCRIPTION (if a waste is not entered in (23) (24))													
25. PROCESS CODES (enter)													
26. PROCESS DESCRIPTION (if a waste is not entered in (25) (26))													
1	F	0	0	1	7700	P	T	0	1	S	0	1	Evaporation/Container Storage
2	F	0	0	2									
3	F	0	0	3									
4	F	0	0	5									
5	W	P	0	1									
6	W	C	0	1									
7	W	T	0	1									
8	D	0	0	1									Included With Above
9													
10													
11													
12													
13													
14													
15													
16													
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24													
25													
26													

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Continued from the front

## IV. DESCRIPTION OF DANGEROUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM SECTION 3(1) ON PAGE 1.

The 300 Area Solvent Evaporator was used for the treatment of radioactively contaminated solvents generated during the fuel fabrication efforts and associated processes. Approximately 7700 pounds of waste were treated in the Solvent Evaporator each year.

The storage pad was used to temporarily store radioactively contaminated solvent waste until the solvent could be treated in the Solvent Evaporator.

## V. FACILITY DRAWING

All existing facilities must include in the space provided on page 3 a basic drawing of the facility (see instructions for more detail).

## VI. PHOTOGRAPHS

All existing facilities must include photographs (aerial or ground-level) that clearly indicate all existing structures, existing storage, treatment and disposal units and sites of future storage, treatment or disposal units (see instructions for more detail).

## VII. FACILITY GEOGRAPHIC LOCATION This information is provided on attached drawings and photographs

LATITUDE (degrees, minutes, &amp; seconds)

LONGITUDE (degrees, minutes, &amp; seconds)

## VIII. FACILITY OWNER

☒ A. If the facility owner is also the facility operator as listed in Section VI on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VI on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER

2. PHONE NO. (give area &amp; no.)

3. STREET OR P.O. BOX

4. CITY OR TOWN

5. ST.

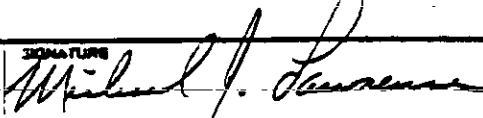
6. ZIP CODE

## IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type) Michael J. Lawrence  
Manager, Richland Operations  
United States Department of Energy

SIGNATURE



DATE SIGNED

3-27-90

## X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)

SIGNATURE

DATE SIGNED

SEE ATTACHMENT

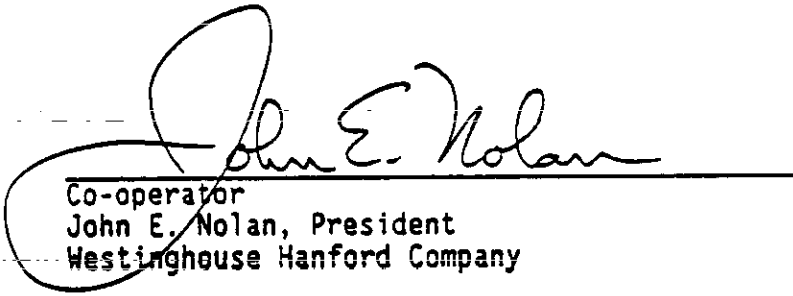
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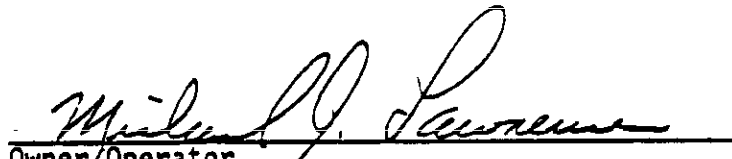


X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

  
Co-operator  
John E. Nolan, President  
Westinghouse Hanford Company

3/5/90  
Date

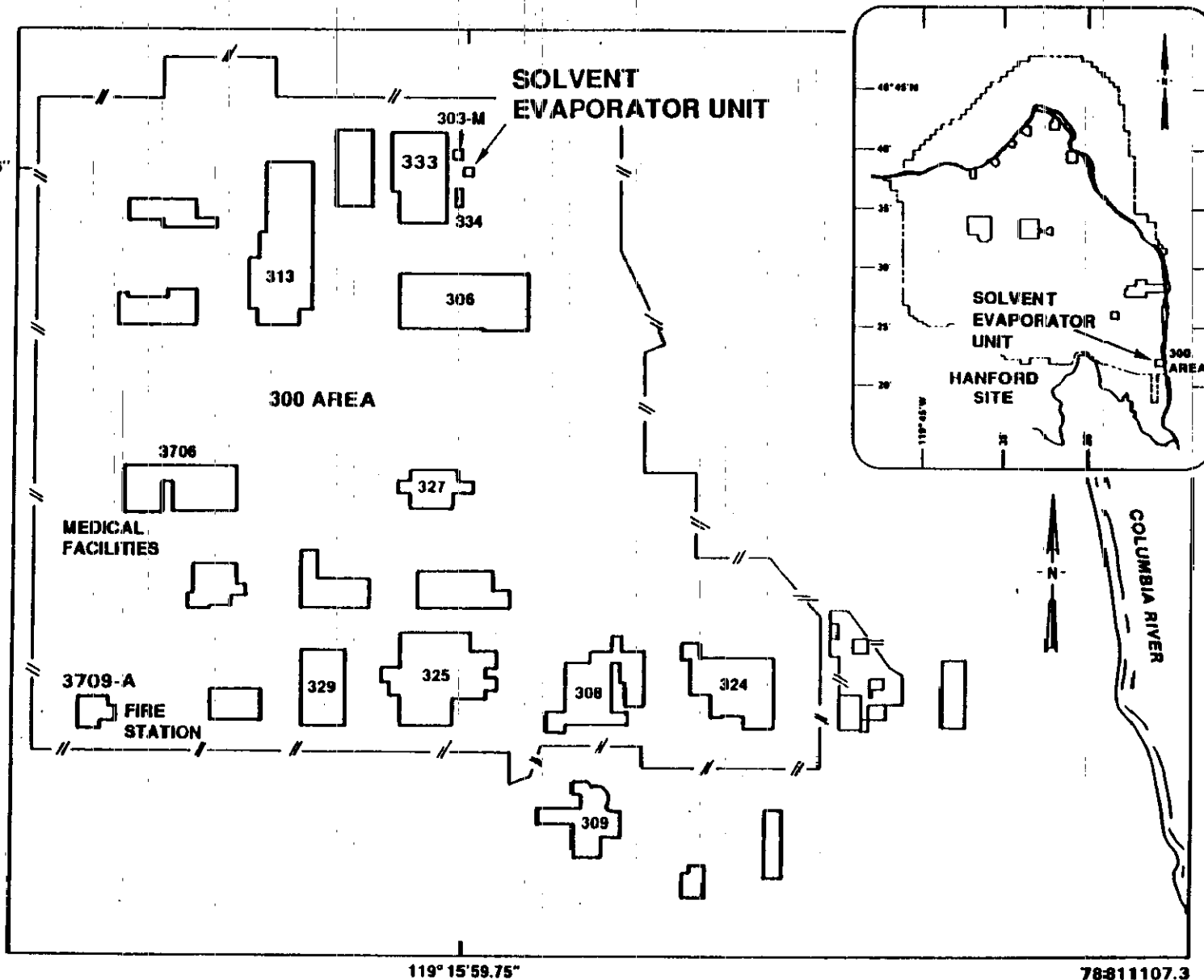
  
Owner/Operator  
Michael J. Lawrence, Manager  
U.S. Department of Energy  
Richland Operations Office

3-27-90  
Date

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# 300 AREA SOLVENT EVAPORATOR UNIT

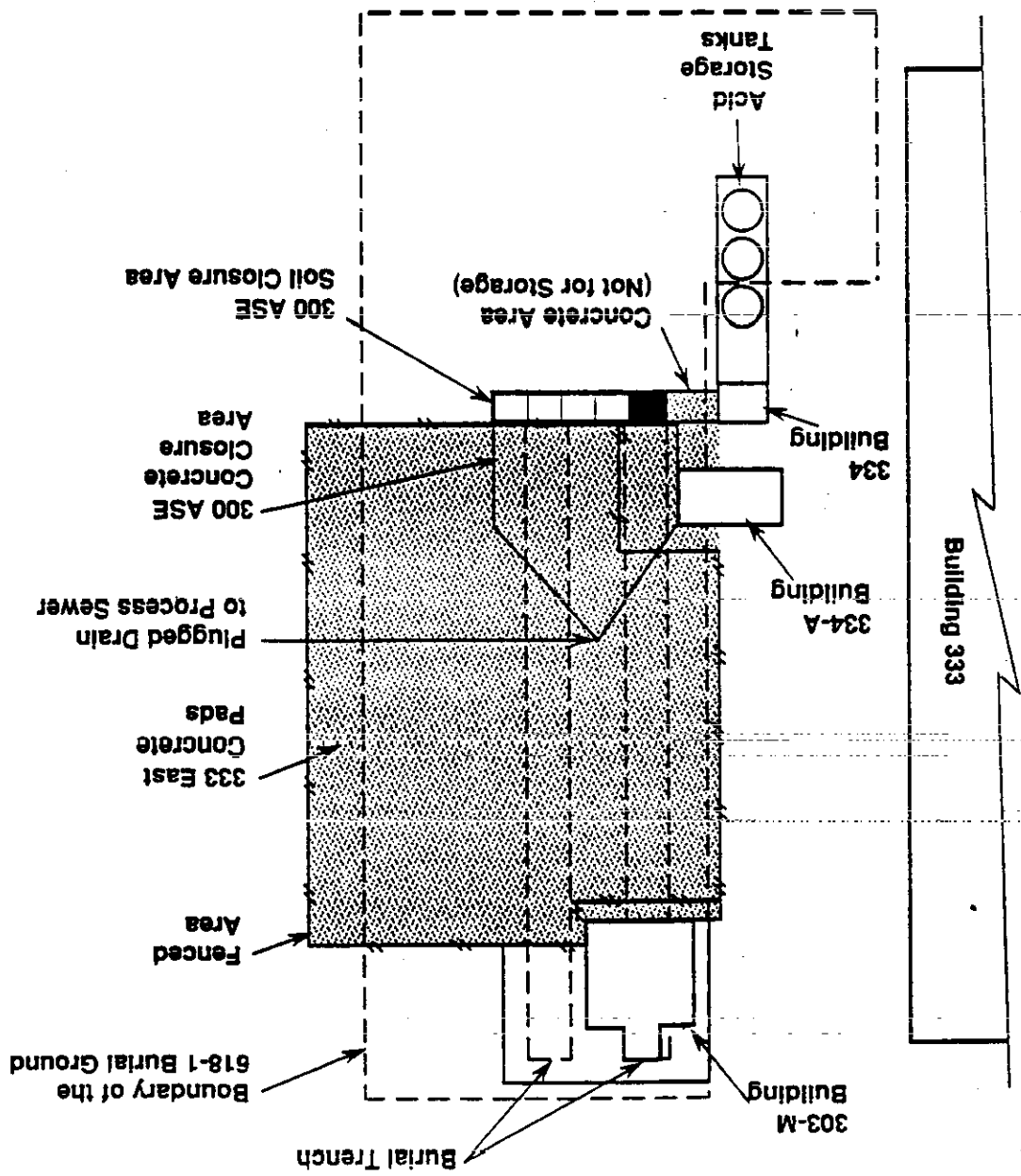


DOE/RL 88-08

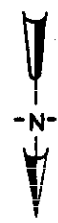
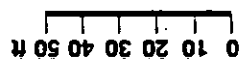
Closure Plan  
300 ASE, Rev. 3  
03/30/90

APP A-9

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Last Location of 300 ASE and Spill Site

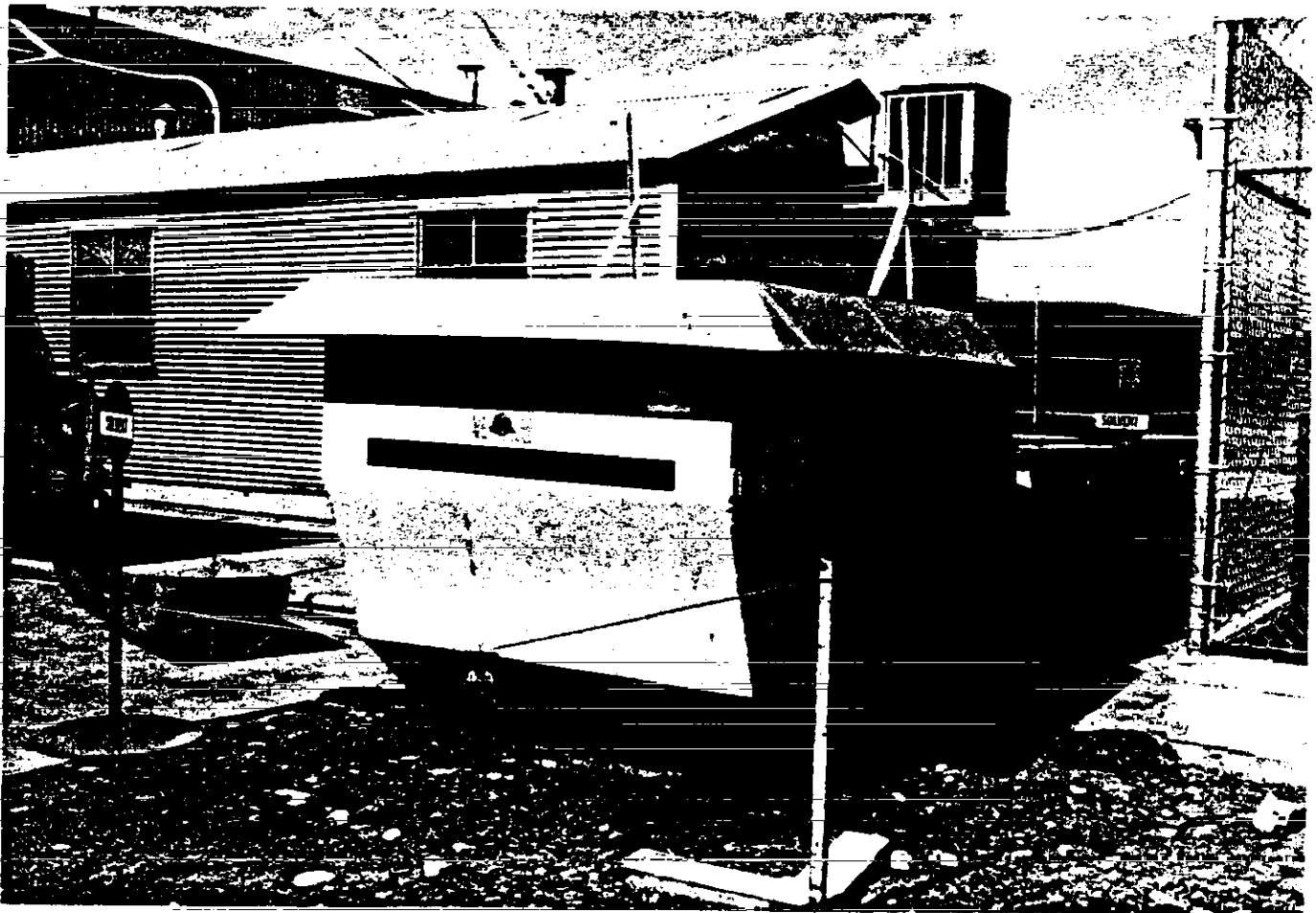


(2-5-90)  
76911137.4

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## 300 AREA SOLVENT EVAPORATOR UNIT



46°35'24.76"  
119°15'59.75"

8507636-3CN  
(PHOTO TAKEN 1985)  
78901124.5M

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APPENDIX B

HANFORD SITE  
WASTE INFORMATION DATA SYSTEM (WIDS)

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CONTENTS

1  
2  
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4

Waste Information Data System

2 pages

9/13/93 2032

HANFORD SITE  
WASTE INFORMATION DATA SYSTEM (WIDS)

9443293.2035

1 Site Name: 618-1 Burial Ground  
2  
3  
4  
5  
6 Status: Operational: Inactive  
7 Radiological: Released  
8  
9 Site Type: Non-Retrievable Solid Waste  
10  
11 Coordinates: N55310/E14987, N55630/E14987, N55310/E14834,  
12 N55630/E14890, N55390/E14834, N55390/E14890  
13  
14 Reference Drawings: H-3-9921 (sheet 2) and H-3-1172  
15  
16 Alias Names: 318-1, Solid Waste Burial Ground No. 1  
17  
18 Location: 300 Area - adjacent to the 333 Building in the  
19 northeast corner of the 300 Area near the  
20 exclusion fence.  
21  
22 Elevations and Depths: Ground (above msl): 390 feet  
23 Water Table (below grade): 48 feet  
24 Site Depth (below grade): 20 feet  
25  
26 Waste Category: Mixed Waste  
27  
28 Service Dates: Start: 1944  
29 End: 1951  
30  
31 Waste Volume: Estimated at 350 tons in 37,000 cubic yards  
32  
33 Contaminated Soil Volume: Not available  
34  
35 Overburden Soil Volume: 1,224 cubic yards  
36  
37 Site Area Boundary: 35,520 square feet  
38  
39 Summary Date: July 30, 1987  
40  
41 Site Description: Burial ground consisting of at least two  
42 trenches running north-south, 16 feet wide  
43 (surface) x 230 feet long x 8 feet deep. There  
44 also are a series of pits 15 feet wide, running  
45 east-west in the south end, 20 feet deep.  
46  
47 Service History: This burial ground was active from 1944-1951.  
48 The site contains large quantities about  
49 16.28 tons of uranium and small quantities of  
50 plutonium and fission products from the  
51 300 Area Reactor Fuel Fabrication facilities  
52 and laboratories.  
53  
54 Associated Structures: None.

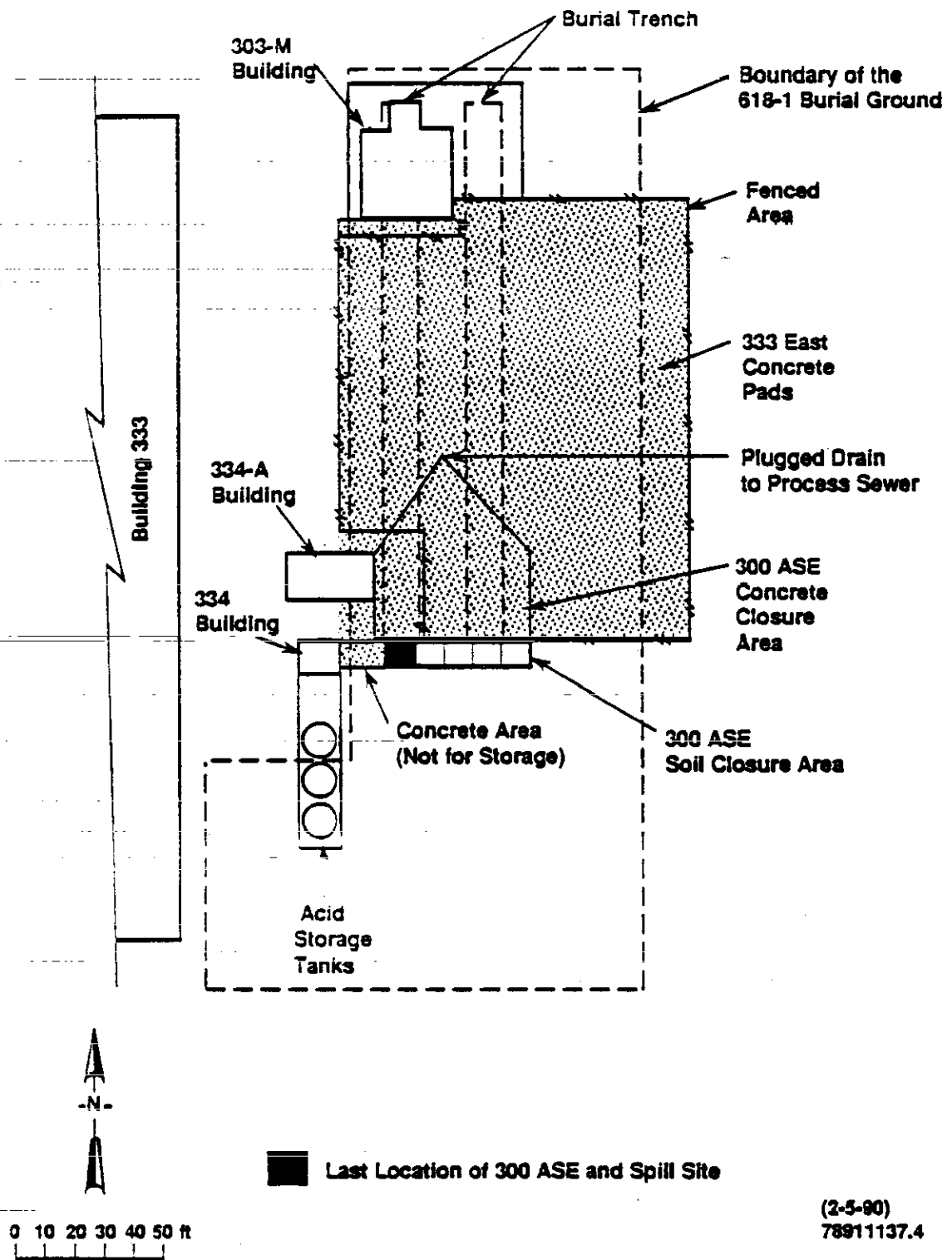


Figure B-1. 300 Area Solvent Evaporator Closure Area and 618-1 Burial Ground.

1  
2  
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7  
8

APPENDIX C

COMPOSITION AND DESIGNATION OF SOLVENT EVAPORATOR WASTE

9413293.2035

## CONTENTS

1		
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4	Table C-1. Toxicity Determination . . . . .	APP C-1
5		
6	Table C-2. Carcinogenesis Determination . . . . .	APP C-2
7		
8	Table C-3. Persistence Determination . . . . .	APP C-2
9		
10	Table C-4. Listed Waste Designations . . . . .	APP C-2
11		
12		

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## APPENDIX C

## COMPOSITION AND DESIGNATION OF SOLVENT EVAPORATOR WASTE

Table C-1. Toxicity Determination.

Component	Concentration(%)	WT%	Category <sup>a</sup>	EC <sup>b</sup>
Perchloroethylene	71	7.10 E+01	C	7.1 E-02
1,1,1-trichloroethane	9	9.00 E+00	C	9.0 E-03
Trichloroethylene	11	1.10 E+01	C	1.1 E-02
Combination mixture <sup>c</sup>	9	9.00 E+00	C	9.0 E-03
Ethyl acetate			D	
Bromine			None	
Used Oil			None	
Methyl ethyl ketone			D	
Methylene chloride			C	
Petroleum naphtha			None	
Aluminum	10ppm	1.0 E-03	None	---
Boron	5ppm	5.0 E-04	None	---
Calcium	52ppm	5.2 E-03	None	---
Iron	78ppm	7.8 E-03	None	---
Lithium	4ppm	4.0 E-04	None	---
Beryllium	<0.11ppm <sup>d</sup>	1.1 E-05	A	1.1 E-06
Phosphorus	25ppm	2.5 E-03	X	2.5 E-03
Silicon	28ppm	2.8 E-03	None	---
Sodium	46ppm	4.6 E-03	A	4.6 E-04
Zirconium	2ppm	2.0 E-04	None	---
Total EC				1.03 E-1

<sup>a</sup> WAC 173-303-084(5) and 40 CFR 302.4.<sup>b</sup> EC=equivalent concentration; from *Registry of Toxic Effects of Chemical Substances 1985-86 Edition Users Guide* (RTECS 1987).<sup>c</sup> The combination mixture will be classified as Toxic C for designating purposes.<sup>d</sup> Calculated concentration.

Note: Concentration of uranium was below detection limits (less than 10 micrograms per milliliter). If the EC is greater than 1 percent, then the solution is regulated for toxicity as WT01 (extremely hazardous waste according to WAC 173-303).

Table C-2. Carcinogenesis Determination.

Component	Concentration (WT%)
Perchloroethylene	71
Trichloroethylene	11
Beryllium	1.1E-05
SUM OF WT% OF CARCINOGENS	>82

Weight percent (wt%) of total carcinogens must be greater than or equal to 1 percent in order to be regulated as WC01 (extremely hazardous waste).

Table C-3. Persistence Determination.

Component	Concentration (WT%)
Perchloroethylene	71
1,1,1-trichloroethane	9
Trichloroethylene	11
SUM OF WT% OF CARCINOGENS	>90

Weight percent (wt%) of total halogenated hydrocarbons must be greater than or equal to 1 percent in order to be regulated as WP01 (extremely hazardous waste).

Table C-4. Listed Waste Designations\*.

Perchloroethylene	F001, WT01, WC01, WP01, D001
1,1,1-trichloroethane	F002, WP01
Trichloroethylene	F001, WC01, WP01
Ethyl acetate	F003
Methyl ethyl ketone	F005
Methylene chloride	F001

\* Based on WAC 173-303 dangerous waste listings.



**APPENDIX D**  
**PROCEDURES, WORK AUTHORIZATIONS, BURIAL RECORDS, AND**  
**COMPLIANCE CHECKSHEETS**

**NOTE:** These historical procedures are reprinted without benefit of current editorial standards. These procedures do not necessarily reflect the current Hanford Site environmental practices.

940329.2039

## CONTENTS

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4	UNI-M-46	Waste Solvent System	2 Pages
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6	UNI-M-58	Degreaser Solvent Fill and Disposal System (Issued 1/11/85)	3 Pages
7			
8			
9	UNI-M-58	Degreaser Solvent Fill and Disposal System (Issued 1/20/84)	4 Pages
10			
11			
12	UNI-M-58	Degreaser Solvent Fill and Disposal System (Issued 9/18/79)	3 Pages
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24	PWR-B-441	Sludge Solidification Procedures (Issued 8/8/85)	4 Pages
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33	3-1A-7G-1	Burial Compliance Checksheet Dated 6/25/85	4 Pages
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35	3-1A-7L-1	Burial Compliance Checksheet Dated 1/21/86	4 Pages
36			
37	313-UNC-86-10	Solid Waste Burial Record	1 Page
38			
39	UNI-M-38	Hazardous Work Permits	1 Page
40			
41	WA 85-2510	Disposition of Solvent Evaporator	5 Pages
42			
43	3-5B-1A-1	Burial Compliance Checksheet	4 Pages
44			
45	313-UNC-86-4	Solid Waste Burial Record	1 Page
46			

# SAMPLE

## UNC NUCLEAR INDUSTRIES

FUELS OPERATIONS DIVISION  
ENVIRONMENTAL CONTAMINATION CONTROL PROCEDURES

Document No.

UNI-M-46

Date Issued

7-15-83

Page No.

1 of 2

Supersedes Issue Dated

6-1-82

Subject

ECC-114 - WASTE-SOLVENT SYSTEM

Issued By

Fuels Engineering

### BASIS

At the present time there is no absolute environmentally acceptable manner (such as a high temperature incinerator) for disposing of waste solvents at Hanford. Most of the solvents from Fuels Operations Division are waste vapor degreasing solvents (trichloroethylene, 1,1,1 trichloroethane and perchloroethylene) and can be contaminated with uranium and Be from degreasing uranium billets and Be-Zr-2 braze rings.

A dumpster has been provided at a remote distance from occupied areas and within a restricted area (east of the 334 Building) and the waste solvents are poured into this dumpster where the excess solvent is allowed to slowly evaporate. When the dried sludge has built-up sufficiently, the sludge and excess solvent will be packaged as "Liquid Organic Material" in 17C drums for disposal as per U contaminated oil (see ECC-104).

### CONTROLS

#### A. Administrative Controls

The use of the solvent dumpster shall be limited to organic solvents that cannot be disposed of in the waste oil system as per ECC-104. (No heavy oils, greases or aqueous solutions.)

#### B. Inspection of Facilities

Inspection of the solvent dumpster on the east side of 334 Building shall be conducted and documented annually by facility management.

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# SAMPLE

## UNC NUCLEAR INDUSTRIES

FUELS OPERATIONS DIVISION  
ENVIRONMENTAL CONTAMINATION CONTROL PROCEDURES

Document No.

UNI-M-46

Date Issued

7-15-83

Page No.

2 of

Supersedes Issue Dated

6-1-82

Subject

ECC-114 - WASTE SOLVENT SYSTEM

Issued By

Fuels Engineering

Revision 1, Dated April 17, 1978:

Basis: Added 1,1,1 trichloroethane to list of degreasing solvents.

Revision 2, Dated September 26, 1980:

Basis: Now require that when the sludge builds up in the waste dumpster it will be barrelled for disposal (not burying the dumpster).

Control B: Deleted DUN-M-31.

Revision 3, Dated June 1, 1982:

Basis: ~~Sludge in dumpster~~ to be disposed of in 17C drums as per ECC-104 not in 17H drums as solid waste.

Revision 4, Dated July 15, 1983:

Basis: Changed "Fuels Production Department" to "Fuels Operations Divisi.

OBSOLETE AS OF

FEB 12 1986

SAMPLE

<b>UNC NUCLEAR INDUSTRIES</b> <b>FUELS PRODUCTION DEPARTMENT</b> <b>OPERATING PROCEDURES</b>		Document No.	
		UNI-M-58	
		Procedure No.	Page No.
		E-14	1 of 3
Date Issued		Supersedes Issue Dated	
1-11-85		1-20-84	
Title		Issued By	
DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM		FUELS OPERATIONS	
<p><b>I. <u>BASIS</u></b></p> <p>Clean perchloroethylene for filling the degreasers is obtained in drums from 303-F. A portable pump is used to transfer from the drum into the degreaser.</p> <p>No. 3 degreaser uses solvent: 1,1,1-trichloroethane. This solvent is received in a 54 gallon drum and is stored near the degreaser. The solvent is pumped from the drum into the degreaser with a portable pump. The pump is stored behind tank #24.</p> <p><b>II. <u>REFERENCE</u></b></p> <p>DUN-5601  UNI-M-38  Job Hazard Breakdown #33-1</p> <p><b>III. <u>EQUIPMENT NEEDED</u></b></p> <p>Bump cap  Acid goggles  Coveralls  Safety shoes or toe protectors  Leather or rubber gloves  Oil sorbent sheets</p> <p><b>IV. <u>PROCEDURE</u></b></p> <p><b>A. <u>Filling of the Degreasers</u></b></p> <p>When solvent is needed in a degreaser, the chem bay chief operator will bring it into the 333 Building in 55 gallon drums and pump it into the degreaser.</p> <p><b>CAUTION:</b> The degreasers using perchlorethylene receive the clean solvent into the cold side, it is possible to overfill them as the perchlorethylene goes into the degreaser faster than it flows from the cold side to the hot side. Due to this delay in the perchlorethylene moving from the hot side, shut off perchlorethylene fill valve, when the level in the hot side is approximately 1" below the desired level. This will prevent overfilling. Wait about 2 minutes, check solvent level and add more if needed.</p>			
Review Dates and Initials			
Prepared by		Reviewed by	
P. Paul Supervisor, Fuels Operations		H. G. ... Manager, Fuels Operations	
Approved by		1-9-85	

9413293-2043

<b>UNO NUCLEAR INDUSTRIES</b> <b>FUELS PRODUCTION DEPARTMENT</b> <b>OPERATING PROCEDURES</b>		Document No. <b>UNI-M-58</b> <hr/> Procedure No. <b>E-14</b> Page No. <b>2 of 3</b> <hr/> Date Issued <b>1-11-85</b> Subsequent Issue Date <b>1-20-84</b>	
Title <b>DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM</b>		Issues By <b>FUELS OPERATIONS</b>	
<p><b>B. <u>Emptying Degreaser</u></b></p> <p>Each degreaser (except end cap and support etch) is equipped with a spray wand and a drain line to remove the solvent. Use the same pump to remove solvent from #3 degreaser that was used to fill it.</p> <ol style="list-style-type: none"> <li>1. Close overflow line and boil off solvent from vapor zone to condensate storage tank. Shut off heater and let vapor zone cool down.</li> <li>2. Pump out cold reservoir by using the spray wand. Pump into barrels. Return the spray wand properly to its holder immediately upon completion of pumping.</li> <li>3. Pump out cool solvent in boiling side by attaching a portable pump to drain line. Pump into barrels (old black trichloroethane barrels, which are stored next to 334 by the waste solvent dumpster, are used to transfer the dirty solvent).</li> </ol> <p><b>C. A waste solvent dumpster is located east of the 334 Building. Transfer barrels of dirty solvent to waste solvent dumpster and pour into dumpster.</b></p> <p><b>D. If the solvent level in the dumpster is high, speed up the evaporation by using the steam coils:</b></p> <ol style="list-style-type: none"> <li>1. Set up "Warning Steam Hose" signs in 334 Building and east of 334 Building near nose.</li> <li>2. Turn on steam in 334 Building.</li> <li>3. Allow solvent to evaporate to desired level and then turn off steam.</li> </ol>			
Review Dates and Initials			
Prepared By <i>R. Kuck</i> Supervisor, Fuels Operations		Reviewed By <i>H. J. Jenson 1/2/85</i>	
Approved By <i>John A. Kinnage 1-9-85</i> Manager, Fuels Operations			

REPLACEMENT AS OF

FEB 10 1985

SAMPLE

UNC NUCLEAR INDUSTRIES  
FUELS PRODUCTION DEPARTMENT  
OPERATING PROCEDURES

Document No. UNI-M-58	
Procedure No. E-14	Page No. 3 of 3
Date Issued 1-11-85	Supersedes Issue Dated 1-20-84

Title

DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM

Issued By

FUELS OPERATIONS

V. ACCIDENTAL SPILLS OR LEAKS

- A. If any solvent accidentally gets on you, follow the emergency procedure as defined in Chemical Bulletins #3 and #26 from UNI-M-38.
- B. If any solvent is spilled onto the ground or into a trench, notify supervision immediately. If oil sorbant sheets are handy use them to contain the spill (even in a trench with water) and then notify supervision. Supervision will arrange to properly dispose of the solvent soaked sheets.

WP#0025E

Review Dates  
and Initials

Prepared by

Supervisor, Fuels Operations

Reviewed by

Approved by

Manager, Fuels Operations

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OBSCLETE AS OF FEB 11 1995

SAMPLE

UNC NUCLEAR INDUSTRIES  
FUELS PRODUCTION DEPARTMENT  
OPERATING PROCEDURES

Document No.  
UNI-M-58  
Procedure No.  
E-14  
Page No.  
1 of 4  
Date Issued  
1-20-84  
Supersedes Issue Dates  
9-18-79

Title

DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM

FUELS OPERATIONS

I. BASIS

Clean perchloroethylene for filling the degreasers is obtained from the 313 pumping station. It can either be pumped directly to the degreasers or it can be put into the solvent holding tank in the chem bay mezzanine and later be used to fill the degreaser by gravity flow. The normal procedure is to use the perchlorethylene from the solvent still storage tank.

No. 3 degreaser uses solvent: 1,1,1-trichloroethane. This solvent is received in a 54 gallon drum and is stored near the degreaser. The solvent is pumped from the drum into the degreaser with a portable pump. The pump is stored behind tank #24.

II. REFERENCE

OUN-5601  
UNI-M-58  
Job Hazard Breakdown

III. EQUIPMENT NEEDED

Bump cap  
Acid goggles  
Coveralls  
Safety shoes or toe protectors  
Leather or rubber gloves

IV. PROCEDURE

A. To obtain fresh perchlorethylene from the 313 Building, contact the 313 fuel recovery operator and notify him that you are ready to receive perchlorethylene. Open valve T-1 and watch the storage tank until it is full. Shut off valve T-1 and tell the 313 operator that the pumping is completed. Valve T-2 is in the supply line to the degreasers and is left open.

B. Filling of the Degreasers

When perchlorethylene is desired in a degreaser in the 333 Building, open the fill valve located on the degreaser. Each valve is numbered as listed:

Review Date  
and Initials

Prepared by  
E. G. [Signature]  
Supervisor, Fuel Operations

Reviewed by  
[Signature]  
12/27/83

Approved by  
[Signature]  
Manager, Fuel Operations

9413293.2046

COPIES AS OF

SEP 11 1985

SAMPLE

<b>UNC NUCLEAR INDUSTRIES</b> <b>FUELS PRODUCTION DEPARTMENT</b> <b>OPERATING PROCEDURES</b>		Document No. UNI-M-58	
		Procedure No. E-14	Page No. 2 of 4
		Date Issued 1-20-84	Supersedes Issue Dated 9-18-79
Title <b>DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM</b>		Issued By <b>FUELS OPERATIONS</b>	
<p>No. 1 degreaser (vacublast) valve #T-7          No. 2 degreaser (final etch) valve #T-11.          No. 3 degreaser (end cap and support etch) filled from barrel of 1,1,1-trichloroethane          No. 4 degreaser (billet cleaning) valve #T-4          No. 5 degreaser (component cleaning) valve #T-13          No. 6 degreaser (billet lube) valve #T-16</p> <p>Observe the filling of the degreaser and shut off the valve when the desired level is reached.</p> <p><b>CAUTION:</b> The degreasers using perchlorethylene receive the clean solvent into the cold side, it is possible to overfill them as the perchlorethylene goes into the degreaser faster than it flows from the cold side to the hot side. Due to this delay in the perchlorethylene moving from the hot side, shut off perchlorethylene fill valve, when the level in the hot side is approximately 1" below the desired level. This will prevent overfilling. Wait about 2 minutes, check solvent level and add more if needed.</p> <p><b>C. Emptying Degreaser</b></p> <p>Each degreaser (except #3) is equipped with a spray wand and a drain line to remove the solvent. Use the same pump to remove solvent from #3 degreaser that was used to fill it.</p> <ol style="list-style-type: none"> <li>1. Pump out cold reservoir by using the spray wand. Pump into barrels.</li> <li>2. Pump out cool solvent in boiling side by attaching a portable pump to drain line. Pump into barrels.             <ol style="list-style-type: none"> <li>a. Fuels Maintenance will supply pump, fitting and make connections.</li> <li>b. Barrels supplied by Materials Services.</li> </ol> </li> </ol> <p><b>D. A waste solvent dumpster is located east of the 334 Building. Transfer barrels of dirty solvent to waste solvent dumpster and pour into dumpster.</b></p>			
Review Dates and Initials			
Prepared by <i>[Signature]</i> 12-12-83 Supervisor, Fuels Operations		Reviewed by <i>[Signature]</i> 12-22-83 Manager, Fuels Operations	

# SAMPLE

<b>UNC NUCLEAR INDUSTRIES</b>  <b>FUELS PRODUCTION DEPARTMENT</b>  <b>OPERATING PROCEDURES</b>		Document No.		
		UNI-M-58		
		Procedure No.	Page No.	
		E-14	3 of 4	
Title	DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM	Date Issued	Supersede Issue Dated	
		1-20-84	9-18-79	
		Issued By	FUELS OPERATIONS	
<p>E. If the solvent level in the dumpster is high, speed up the evaporation by using the steam coils:</p> <ol style="list-style-type: none"> <li>1. Set up "Warning Steam Hose" signs in 334 Building and east of 334 Building near hose.</li> <li>2. Turn on steam in 334 Building.</li> <li>3. Allow solvent to evaporate to desired level and then turn off steam.</li> </ol>				
<p>WP#0025E</p>				
Review Dates and Initials				
Prepared by <i>[Signature]</i> Supervisor, Fuels Operations	12-12-83	Reviewed by <i>[Signature]</i> 10/31/83	Approved by <i>[Signature]</i> Manager, Fuels Operations	

9413293.2012

10 11 1995

# SAMPLE

## UNC NUCLEAR INDUSTRIES

### FUELS PRODUCTION DEPARTMENT OPERATING PROCEDURES

Document No.

UNI-M-58

Procedure No.

E-14

Page No.

4 of 4

Date issued

1-20-84

Supersedes issue dates

9-18-79

Title

DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM

Issued by

FUELS OPERATIONS

Perchlor  
Storage

T2

T1

From 313

T3

Billet  
Degreaser

Copper-Zinc  
Degreaser

4

T4

T5

T13

Steam

Steam

Final Etch  
Degreaser

2

T11

T14

T9

T5

T15

T16

Billet Lube  
Degreaser

6

T10

T7

Vacublast

1

T8

T12

Review Dates  
and Initials

Prepared by

*[Signature]* 1-16-84  
Supervisor, Fuels Operations

Reviewed by

*[Signature]* 10/31/83  
Manager, Fuels Operations

Approved by

*[Signature]*  
Manager, Fuels Operations

6402-8628-116  
9413253-2049

COMPLETE AS OF FEB 9 1984

FUELS PRODUCTION DEPARTMENT  
OPERATING PROCEDURES  
FUELS OPERATION

SAMPLE

UNI-M-58

Title

DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM

Procedure No

E-14

I. BASIS

Clean perchloroethylene for filling the degreasers is obtained from the 313 pumping station. It can either be pumped directly to the degreasers or it can be put into the solvent holding tank in the chem bay mezzanine and later be used to fill the degreasers by gravity flow. The normal procedure is to use the perchloroethylene from the solvent still storage tank.

No. 3 degreaser uses solvent: 1,1,1-trichloroethane. This solvent is received in a 54 gallon drum and is stored near the degreaser. The solvent is pumped from the drum into the degreaser with a portable pump. The pump is stored behind tank #24.

II. REFERENCE

DUN-5601  
UNI-M-38  
Job Hazard Breakdown

III. EQUIPMENT NEEDED

1. Acid goggles
2. Coveralls
3. Safety shoes and toe protectors
4. Leather or rubber gloves

IV. PROCEDURE

A. To obtain fresh perchloroethylene from the 313 Building, contact the 313 fuel recovery operator and notify him that you are ready to receive perchloroethylene. Open valve T-1 and watch the storage tank until it is full. Shut off valve T-1 and tell the 313 operator that the pumping is completed. Valve T-2 is in the supply line to the degreasers and is left open.

B. Filling of the Degreasers

When perchloroethylene is desired in a degreaser in the 333 Building, open the fill valve located on the degreaser. Each valve is numbered as listed:

- No. 1 degreaser (vacublast) valve #T-7
- No. 2 degreaser (final etch) valve #T-11
- No. 3 degreaser (end cap and support etch) filled from barrel of 1,1,1 trichloroethane
- No. 4 degreaser (billet cleaning) valve #T-4
- No. 5 degreaser (component cleaning) valve #T-13
- No. 6 degreaser (billet lube) valve #T-16

Reviewed by: <i>[Signature]</i>	Date: 8-30-79			
Prepared By: <i>[Signature]</i>	Approved By: <i>[Signature]</i>	Date Issued: 9-18-79	Supersedes Issue Dated: 6-20-78	Page No. 1 of 3
Supv. Fuels Operation	Mgr. Fuels Operation			

ABSOLUTE AS OF FEB 07 1981

FUELS PRODUCTION DEPARTMENT  
OPERATING PROCEDURES  
FUELS OPERATION

SAMPLE

UNI-M-58

Title	Procedure No.
DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM	E-14

Observe the filling of the degreaser and shut off the valve when the desired level is reached.

**CAUTION:** All of the degreasers receive the clean perchloroethylene into the cold side, it is possible to overfill them as the perchloroethylene goes into the degreaser faster than it flows from the cold side to the hot side. Due to this delay in the perchloroethylene moving from the cold side to the hot side, shut off perchloroethylene fill valve, when the level in the hot side is approximately 1" below the desired level. This will prevent overfilling. Wait about 2 minutes, check solvent level and add more if needed.

C. Emptying Degreaser

Each degreaser (except #3) is equipped with a spray wand and a drain line to remove the solvent. Use the same pump to remove solvent from #3 degreaser that was used to fill it.

1. Pump out cold reservoir by using the spray wand. Pump into barrels.
2. Pump out cool solvent in boiling side by attaching a portable pump to drain line. Pump into barrels.
  - a. Fuels Maintenance will supply pump, fitting and make connections.
  - b. Barrels supplied by Material Services.

D. A waste solvent dumpster is located east of the 334 Building. Transfer barrels of dirty solvent to waste solvent dumpster and pour into dumpster.

E. If the solvent level in the dumpster is high, speed up the evaporation by using the steam coils:

1. Set up "Warning Steam Hose" signs in 334 Building and east of 334 Building near hose.
2. Turn on steam in 334 Building.
3. Allow solvent to evaporate to desired level and then turn off steam.

Reviewed by: <i>E. W. Smith</i>	Date: 8-30-79		
Prepared by: <i>H. D. Price</i>	Approved by: <i>J. H. [Signature]</i>	Date Issued	Supersedes Issue Dated
Surv., Fuels Operation	Mgr., Fuels Operation	9-18-79	6-20-78
		Page No.	2 of 3

RESOLUT AS 14

FEB 07 1984

SAMPLE

FUELS PRODUCTION DEPARTMENT

OPERATING PROCEDURES

FUELS OPERATION

UNI-M-58

Title

DEGREASER SOLVENT FILL AND DISPOSAL SYSTEM

Procedure No.

E-14

Perchlor  
Storage

T2

T1

From 313

T3

Billet  
Degreaser

Copper-Zinc  
Degreaser

4

T4

T5

5

steam

T13

steam

Final Etch  
Degreaser.

2

T11

T14

T9

Billet Lube  
Degreaser

T15

T16

6

T6

T10

T7

Vacublast

1

T8

T12

Reviewed by: *E. A. 2*

Date: 8-30-79

Prepared By

Approved By

Date Issued

Supersedes  
Issue Dated

Page No.

*H. D. Rice*

*J. H. 17*

3 of 3

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FUELS PRODUCTION DIVISION  
OPERATING PROCEDURES  
SHOP OPERATIONS

SAMPLE

UNI-M-58

Title

PERCHLOR FILL AND DISPOSAL SYSTEM

Procedure No.  
CA-748 E-14

I. BASIS

REPLACES AS OF OCT 1 1978

Clean perchlor for filling the degreasers is obtained from the 313 pumping station. It can either be pumped directly to the degreasers or it can be put into the perchlor still holding tank in the chem bay meazzanine and later be used to fill the degreasers by gravity flow. The normal procedure is to use the perchlor from the perchlor still storage tank.

II. REFERENCE

DUN-5601  
UNI-M-38  
DUN-5750  
Job Hazard Breakdown

III. EQUIPMENT NEEDED

1. Acid goggles.
2. Coveralls
3. Safety shoes and toe protectors.
4. Leather or asbestos gloves.

IV. PROCEDURE

- A. To obtain fresh perchlor from the 313 Building, contact the 313 fuel recovery operator and notify him that you are ready to receive perchlor. Open valve T-1 and watch the storage tank until it is full. Shut off valve T-1 and tell the 313 operator that the pumping is completed.

B. Filling of the Degreasers

When perchlor is desired in a degreaser in the 333 Building, open the valve nearest the degreaser. Observe the filling of the degreaser and shut off the valve when the desired level is reached.

CAUTION: All of the degreasers receive the clean perchlor into the cold side, it is possible to overfill them as the perchlor goes into the degreaser faster than it flows from the cold side to the hot side. Due to this delay in the perchlor moving from the cold side to the hot side, shut off perchlor fill valve before the desired level is reached to prevent overfilling.

Prepared By <i>H. D. R.</i> Surv., Shop Operations	Approved By <i>[Signature]</i> Mr., Shop Operations	Date Issued 6-20-78	Supersedes Issue Dated 4-11-77	Page No. 1 of 3
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9413293.2053

# SAMPLE

FUELS PRODUCTION DIVISION  
OPERATING PROCEDURES  
SHOP OPERATIONS

ISSUETS NO. 07

ST 01 173

UNI-M-58

Title

PERCHLOR FILL AND DISPOSAL SYSTEM

Procedure No.

CA-748 E-14

C. Emptying Degreaser

1. Pump out cold reservoir by using spray wand or attaching a portable pump to drain line. Pump into barrels.
2. Pump out cool solvent in boiling side by using supplied pump or attaching a portable pump to drain line. Pump into barrels.

D. Transfer barrels of dirty solvent to waste solvent dumpster and pour into dumpster.

E. If the solvent level in the dumpster is high, speed up the evaporation by using the steam coils:

1. Uncoil hoses at dumpster and in 334 Building and attach.
2. Set up "Warning Steam Hose" signs in 334 Building and east of 334 Building near hose.
3. Turn on steam in 334 Building.
4. Allow solvent to evaporate to desired level and then turn off steam.
5. Let steam hose cool before disconnecting and coiling up hose.

Prepared By

H. D. Rice  
Supt., Shop Operations

Approved By

*[Signature]*  
Mr., Shop Operations

Date Issued

6-20-78

Supersedes  
Issue Dated

4-11-77

Page No.

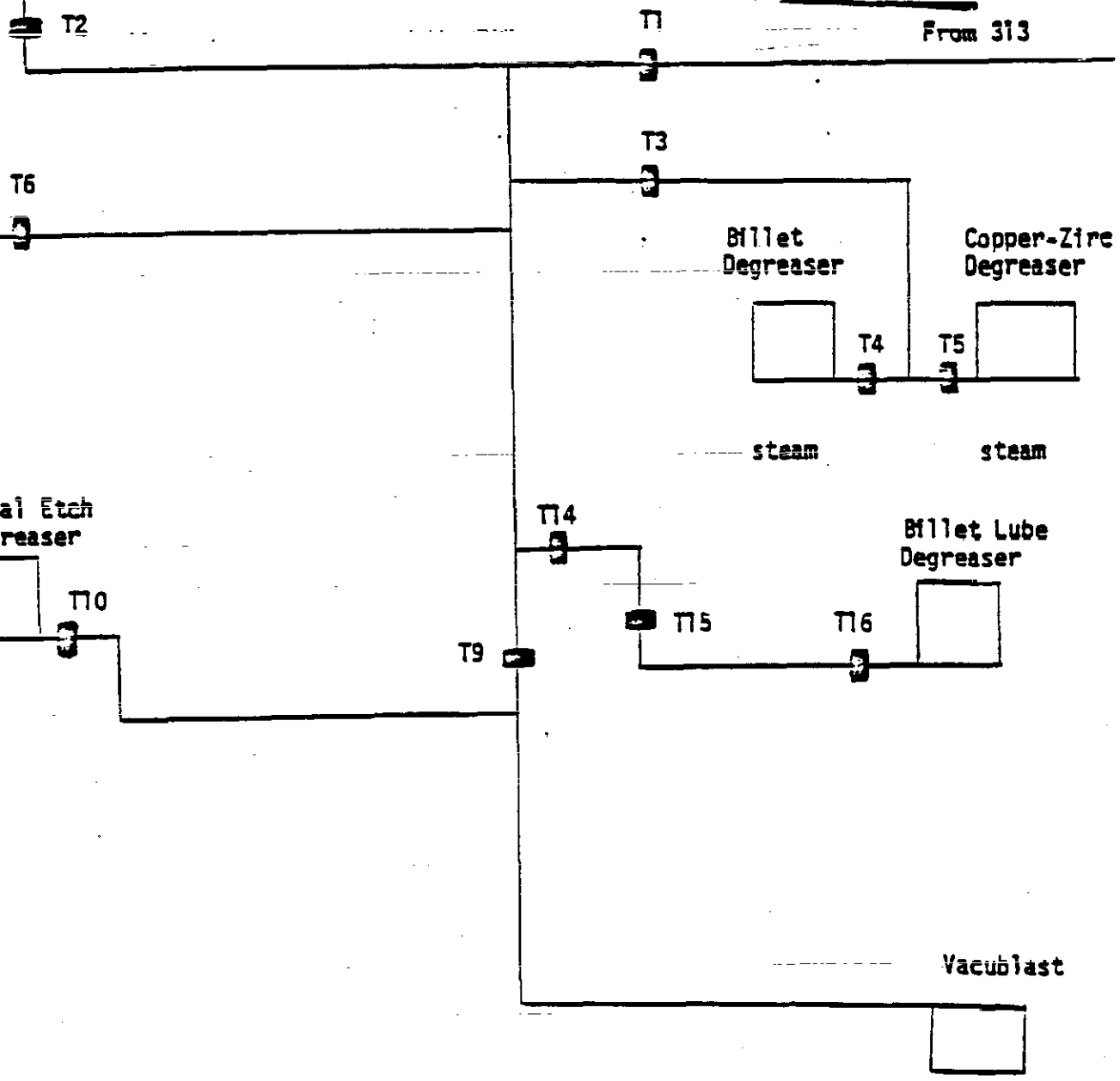
2 of 3

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TRICHLOR FILL AND DISPOSAL SYSTEM

UNCLASSIFIED  
JUN 20 1978  
SAMPLE  
E-14  
DOT 1 1978  
From 313

Trichlor  
Storage



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# SAMPLE

FUELS PRODUCTION DIVISION  
OPERATING PROCEDURES  
SHOP OPERATIONS

COMPLETE AS OF JUN 16 1977  
UNI - M - 58

Title

END CLOSURE - TRICHLOR FILL SYSTEM

Procedure 1

CA-748 E-1

## I. BASIS

Clean trichlor for filling the degreasers is obtained from the 313 pumping station. It can either be pumped directly to the degreasers or it can be put into the trichlor still holding tank in the chem bay mezzanine and later be used to fill the degreasers by gravity flow. The normal procedure is to use the trichlor from the trichlor still storage tank.

## II. PROCEDURE

A. To obtain fresh trichlor from the 313 Building, contact the 313 fuel recovery operator and notify him that you are ready to receive trichlor. Open valve T-1 and watch the storage tank until it is full. Shut off valve T-1 and tell the 313 operator that the pumping is completed.

### B. Filling of the Degreasers

When trichlor is desired in one of the seven degreasers in the 333 Building, open the valve nearest the degreaser. Observe the filling of the degreaser and shut off the valve when the desired trichlor level is reached.

CAUTION: All of the degreasers receive the clean trichlor into the cold side, it is possible to overfill them as the trichlor goes into the degreaser faster than it flows from the cold side to the hot side. Due to this delay in the trichlor moving from the cold side to the hot side, shut off trichlor fill valve before the desired level is reached to prevent overfilling.

Prepared By

A. N. Stinson

Approved By

H. C. Money

Date Issued

1/16/75

Supersedes

Issue Dated

1/12/70

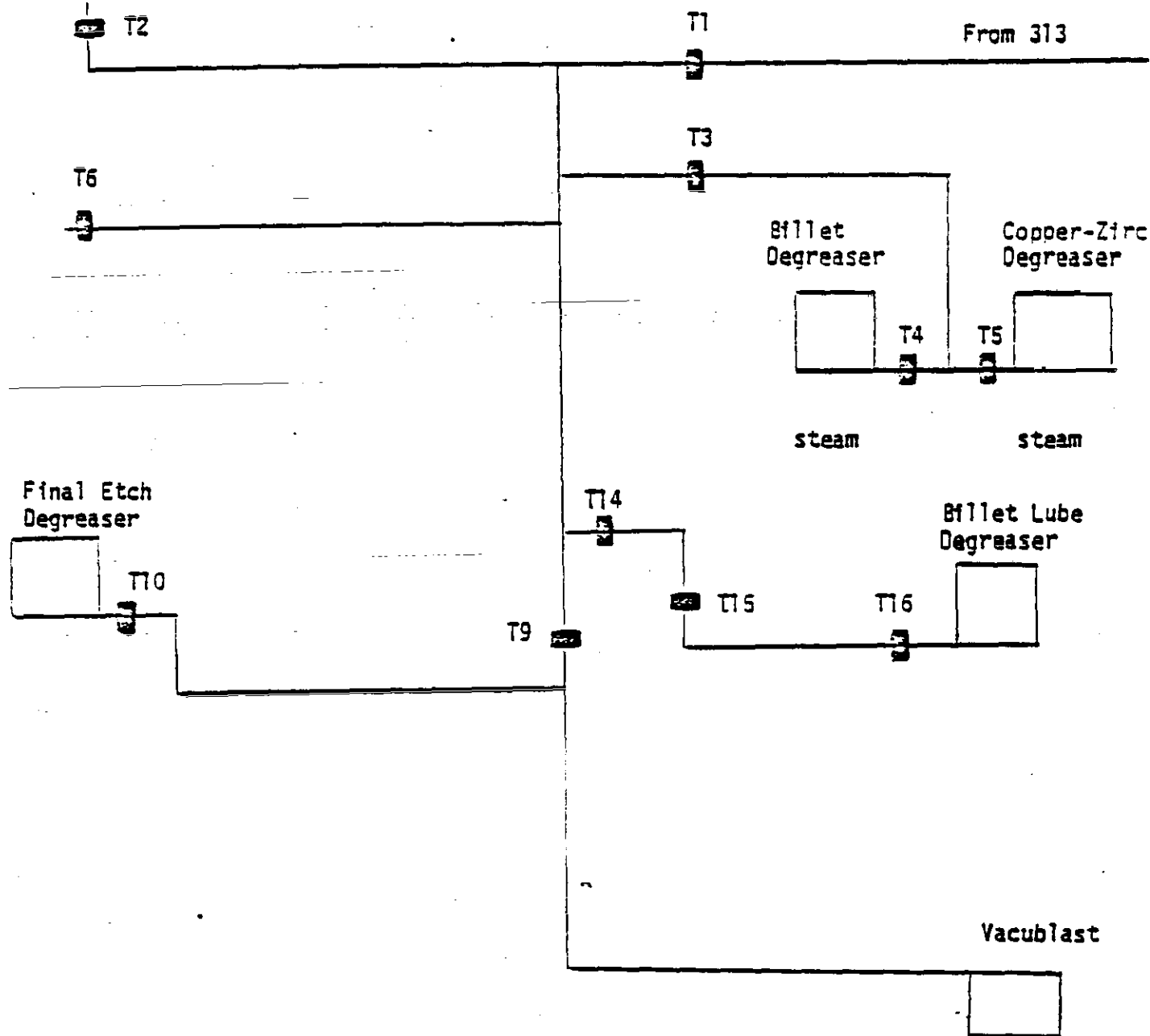
Page No.

1 of 2

# SAMPLE

Trichlor  
Storage

OBSOLETE AS OF JUN 30 1978



# SAMPLE

FUELS PRODUCTION DIVISION  
OPERATING PROCEDURES  
SHOP OPERATIONS

OBsolete AS OF JULY 30 1979

UNI-M-58

Title

PERCHLOR FILL SYSTEM

Procedure No  
CA-748 E-

I. BASIS

Clean perchlor for filling the degreasers is obtained from the 313 pumping station. It can either be pumped directly to the degreasers or it can be put into the perchlor still holding tank in the chem bay mezzanine and later be used to fill the degreasers by gravity flow. The normal procedure is to use the perchlor from the perchlor still storage tank.

II. REFERENCE

DUN-5601  
UNI-M-38  
DUN-5750  
Job Hazard Breakdown

III. EQUIPMENT NEEDED

1. Acid goggles.
2. Coveralls
3. Safety shoes and toe protectors.
4. Leather or asbestos gloves.

IV. PROCEDURE

- A. To obtain fresh perchlor from the 313 Building, contact the 313 fuel recovery operator and notify him that you are ready to receive perchlor. Open valve T-1 and watch the storage tank until it is full. Shut off valve T-1 and tell the 313 operator that the pumping is completed.

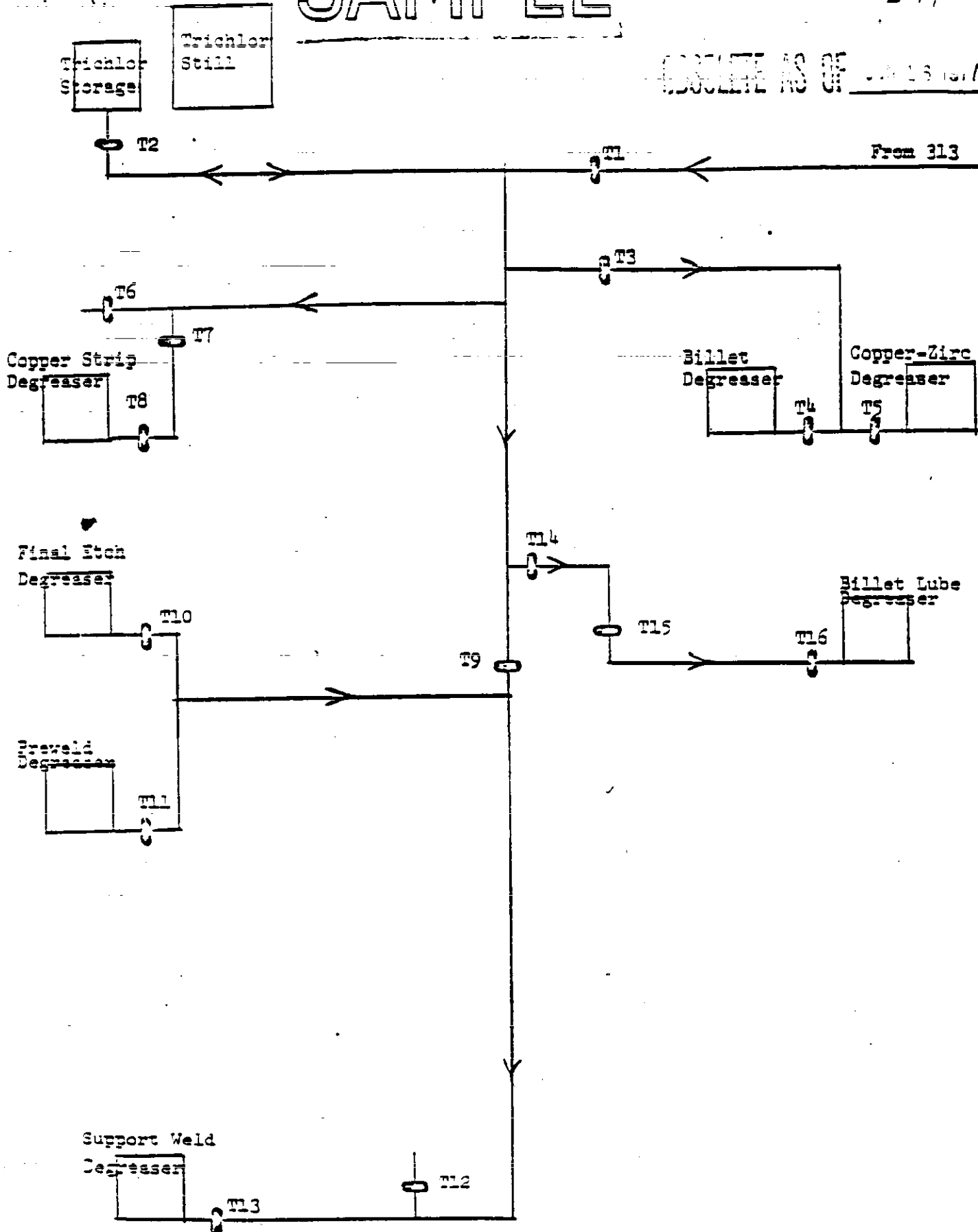
B. Filling of the Degreasers

When perchlor is desired in a degreaser in the 333 Building, open the valve nearest the degreaser. Observe the filling of the degreaser and shut off the valve when the desired level is reached.

CAUTION: All of the degreasers receive the clean perchlor into the cold side, it is possible to overfill them as the perchlor goes into the degreaser faster than it flows from the cold side to the hot side. Due to this delay in the perchlor moving from the cold side to the hot side, shut off perchlor fill valve before the desired level is reached to prevent overfilling.

Prepared By	Approved By	Date Issued	Supersedes Issue Dated	Page No.
H. D. Rios Surv., Shop Operations	H. D. Rios Mr. Shop Operations	4-11-77	1-16-75	1 of 2

COMPLETE AS OF 10/16/51



6025628146



# SAMPLE

UNION NUCLEAR INDUSTRIES

FUELS OPERATIONS

PROCESS WORK REQUEST NO. 8-441

Page 1 of 1

☐ 311 ☐ 312

☒ 334-A

To  
Production Control

From

Process Control

No. Of Elements Involved

Model

N/A

N/A

Dates

CAL Level

From - Aug., 1985 To - Nov., 1985

**MATERIAL USE**

☐ Customer Use

☒ Noncustomer Use

**SPECIFICATIONS WAIVED**

☐ Mfg. Proc. Spec. No. \_\_\_\_\_

☐ Engr. Spec. No. \_\_\_\_\_

☒ None

Test ☐

Specification Change ☐

**Purpose And Justification**

Provide necessary instructions for the solidification and disposal of accumulated solvent sludges in the waste solvent evaporator behind the 334-A Building. The volume of sludge is starting to limit the capacity of the evaporator to receive additional solvent wastes. The accumulated sludges need to be disposed of to allow treatment of future solvent wastes.

**Special Equipment And Material**

Use of special chemical Gypsum formulation to solidify wastes.

**Special Procedures And Responsibility**

Production Control personnel will recover the evaporator sludges and under direction of Fuels Engineering treat the waste in 30 gallon drums as detailed in the attached procedure. Overpack and shipping instructions are outlined in the attached compliance checksheet.

An RNP will be prepared by Production Control to prevent contamination release and augment sanitary measures.

**APPROVALS**

**INITIATOR**

Director, Fuels Engineering

Manager, Fuels Quality Assurance

HF Jensen

Date

8/7/85

Manager, Fuels Production

Supervisor, Fuels Inspection

Director, Fuels/Manufacturing

N/A

N/A

8-8-85

Manager, Process Control

Manager, Production Control

8/7/85

8/8/85

# SAMPLE

PWR B-441  
Attachment 1

## Procedure for the Solidification of Perchloroethylene Solvent Wastes

1. Place a 30 gallon drum in the catch basin next to the perchlor evaporator.
2. Using a hand-held electric pump, transfer 13 gallons of waste from the evaporator into the 30 gallon drum.
3. Add 1-1/2 gallons of Envirostone liquid emulsifier and 6-1/2\* gallons of water, then mix with a clamp-on agitator to create a uniform emulsion.
4. Add 160 lbs. of Envirostone cement while mixing.
5. Mix for 10-15 minutes, then let the mixture set up.
6. After the mixture has hardened, add Dolomite to the top of the 30 gallon drum and attach lid.
7. Overpack the 30 gallon drum in a 55 gallon non-TRU drum and place Dolomite in between the drums.
8. Place the lid on the 55 gallon drum and torque the locking ring bolt to 40 ft-lbs minimum.
9. Label the 55 gallon drum per the attached Burial Compliance checksheet.
10. Place the drums in the waste materials storage area east of the 333 Bldg. until shipment to RHO.

\* Amount of water may be subject to change based on water already present in waste.

9413293.2061

# SAMPLE

## RISK LEVEL EVALUATION

	Minor (Use Control Factor 1-7)	Moderate (Use Control Factor 1-4)	Major (Use Control Factor 1-2)
Personal Injury	4		
Equipment Damage	7		
Violation of Nuclear Safety Specification	7		
Fire from Pyrophoric Metals	7		
Environmental Release	4		

CONCERN

SPILLS AND POSSIBLE SKIN IRRITATION TO  
PERSONNEL. PROPER CARE IN HANDLING SHOULD  
MINIMIZE ANY SERIOUS INCIDENT

WJ Clements  
8/7/81

9413293.2062

ATTACHMENT I  
HAZARD ANALYSIS CHECKLIST

SAMPLE

Job To Be Performed

Building 334A

Date AS NECESSARY

Shift DAY

Description of Job: SOLIDIFY AND PACKAGE SOLVENT  
EVAPORATOR WASTES PLR PUR B-44

Associated Hazards\*

toxic chemicals release Yes

radiological work No

flammables/explosives No

high temperature No

asbestos release No

hazard atmosphere No

nuclear safety requirement No

pyrophoric material No

solid, liquid, gaseous release to environment POSSIBLE

protective clothing requirement Yes

\*Indicate "Yes" or "No" for each hazard item. If "Yes", the special instruction section shall indicate how that hazard is to be controlled.

Special Instructions: THE SOLVENT SLUGS CONTAIN PERCHLOROETHYLENE  
SOLVENT COUPLED WITH ACCUMULATIONS OF VARIOUS ORGANIC  
CONTAMINANTS - CARE MUST BE EXERCISED TO PREVENT  
SPILLAGE AND SKIN CONTAMINATION

Approval: W.H. German 8/7/85  
Section Manager

Revised 8/28/84

9413293.2063

# TEMPORARY RADIATION WORK PROCEDURE

(3 Rem/Hr or Less)

# SAMPLE

Area	Building	Valid Date of Procedure		Temporary RWP No.
300	334-A	From: 8-9-85	To: 12-9-85	300-1-85

Location

Description of Work: Solidification and Disposal of Solvent Sludges

## RADIOLOGICAL CONDITIONS

Low Level Contamination-Liquid Sludge

## RADIATION MONITORING REQUIREMENTS

- ☐ Continuous Rm      ☒ Intermittent
- Contact Rm
- ☒ Before Entering Zone
- ☒ If Conditions Change
- ☒ Release Survey of Personnel and Equipment

PAX XXX XX

Phone No. XXX XX XX

Phone#-6-3311

Pax# - 816

## INSTRUCTIONS

1. Comply with all Fuels Operations "Employee Radiation Zone Rules".
2. Temporary Radiation Zones to be set up for pumping, and storage of drums of waste.
3. Waste drums (smears) shall be <200 cpm., and packaged per UNI-M-29.
4. Comply with Process Work Request No. B-441.

## PROTECTIVE EQUIPMENT REQUIREMENTS

HEAD	<input checked="" type="checkbox"/> Cap <input type="checkbox"/> Hood <input type="checkbox"/> Rubber <input type="checkbox"/> Plastic <input type="checkbox"/> Face Shield <input type="checkbox"/> _____
BODY	<input checked="" type="checkbox"/> 1 Pr. Coveralls <input type="checkbox"/> 2 Pr. Coveralls <input checked="" type="checkbox"/> No Personal Outer Clothes <input type="checkbox"/> Waterproof Outer Layer <input type="checkbox"/> _____
HANDS	<input type="checkbox"/> Canvas Gloves <input type="checkbox"/> Surgeons Gloves <input checked="" type="checkbox"/> Rubber Gauntlets <input type="checkbox"/> Cannons Gloves <input type="checkbox"/> _____
FEET	<input checked="" type="checkbox"/> Canvas Boots <input type="checkbox"/> Shoe Covers <input checked="" type="checkbox"/> Rubbers <input type="checkbox"/> British Leggings <input type="checkbox"/> _____
RESPIRATORY	<input type="checkbox"/> Full Face <input type="checkbox"/> Air Supplied Hood <input type="checkbox"/> Fresh Air <input type="checkbox"/> SCBA <input checked="" type="checkbox"/> Protection as specified by Rm <input type="checkbox"/> _____
PERSONNEL METERS	<input checked="" type="checkbox"/> TLD <input type="checkbox"/> PADI <input type="checkbox"/> PARD <input type="checkbox"/> Self-Reading Pencils <input type="checkbox"/> Finger Ring <input type="checkbox"/> _____

## APPROVALS

<i>JK Marshall</i> 8-14-85	<i>C.F. Pauer</i> 8-16-85
<i>Ma Hauer</i> 8/15/85	

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**FUELS MANUFACTURING DEPARTMENT  
OPERATING PROCEDURES**

Document No.	
UNI-M-57 REV1	
Procedure No.	Page No.
D-411	1 of 3
Date Issued	Supersedes Issue No.
11-12-85	NEW

Title	Issued By
SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS	PRODUCTION CONTROL

**A. PURPOSE**

This procedure describes the process for solidifying waste solvents. Solidification is necessary for the disposal of this material.

**B. DESCRIPTION**

Solvents are used in the manufacturing process of N Reactor fuels. The solvents are used in degreasers to clean the fuel elements and are routinely changed out and pumped into 55-gallon drums for transport. The drum of waste solvent is then solidified.

Waste solvents are solidified by mixing the solvents with cement and liquid emulsifiers. The solidified solvents are packaged in 55-gallon 17H "Non-Tru" drums for disposal.

**C. REFERENCES**

DUN-5601, "Manufacturing Process Specifications".

DUN-M-29, "N-Fuels Process Control Procedures".

UNI-M-32, "Radiation Work Procedures".

UNI-M-38, "Industrial Safety Manual".

UNI-M-59, "Job Hazard Breakdown".

RHO-MA-222 REV1, "Hanford Radioactive Solid Waste Packaging, Storage, and Disposal Requirements".

**D. EQUIPMENT**

30 Gallon 17-H Drums	Leather Gloves	55 Gallon 17-H Drums
Rubber Gloves	Absorbent Material	SWP Clothing
Drum Labels	Dolomite	Envirostone Cement
Drum Pumps	Catch Basin	Drum Agitator
Envirostone Liquid Emulsifier	Extension Cord	Water Hose
Forklift w/drum gipping attach.	Air Hose	Bucket

Review Dates					
Prepared by	11/12/85	Reviewed by	11-12-85	Approved by	11/12/85
Supervisor		Manager, Production Control			

# SAMPLE

## UNC NUCLEAR INDUSTRIES FUELS MANUFACTURING DEPARTMENT OPERATING PROCEDURES

Document No.	
UNI-M-57 DEVI	
Procedure No.	Page No.
0-411	2 of 3
Date Issued	Supersedes Issue Of
11-12-85	NEW

**Title**  
SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS

**Issued By**  
PRODUCTION CONTROL

Tape Measure

Rubber Shoe Covers Paint Stick Marker

Forklift Transport Tray

Bump Cap

Goggles

### E. PROCEDURE

#### 1. Transport of Solvent Drums

a. A Metal Operator, Production Control, shall transport the solvent drums to the solidification location. The Operator shall:

- 1) Assure that the drums are sealed before attempting to move them.
- 2) Assure that a RM survey has been done on the drum and a "Conditional Radiation Release" label is in place on the drum. See attachment I.
- 3) Place one drum in the transport tray.

**WARNING:** Transport only one drum of waste solvent at a time.

#### 2. Solidification Procedure

a. Metal Operators, Production Control, shall perform the solidification process. The Operators shall:

- 1) Obtain a new empty 30 gallon 17-H drum.
- 2) Using a tape measure and paint stick marker, place two marks in the drum. Measuring from the bottom of the drum, place the marks at 10-1/2 inches and 16-1/2 inches respectively on the inside of the drum.

**NOTE:** The marks are used as a gauge when adding ingredients to the drum.

- 3) Place a new empty 55 gallon 17-H drum in the catch basin with "Radioactive Waste" label affixed to one side. See attachment II.
- 4) Place the marked 30 gallon drum inside a 55 gallon drum.

Review Cycles  
and Increas

Prepared by *[Signature]* 11/12/85  
Supervisor *[Signature]* 11/12/85

Reviewed by *[Signature]* 11-12-85

Approved by *[Signature]* 11/12/85  
Manager, Production Control

9413293-2066



**SAMPLE**  
**UNC NUCLEAR INDUSTRIES**  
**FUELS MANUFACTURING DEPARTMENT**  
**OPERATING PROCEDURES**

Document No.	
INT-M-57 REV1	
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Date Issued	Supervisor Issue Of
11-12-85	NCU
Issued By	
PRODUCTION CONTROL	

Title  
**SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS**

- 5) Place a lid on the 30 gallon drum.
- 6) Fill the void between the drums with dolomite.
- 7) Remove the lid from the 30 gallon drum.
- 8) Using an electric solvent pump, transfer 13 gallons of waste solvent from the drum into the 30 gallon drum. Fill to first mark from the bottom of the drum at 10-1/2 inches.
- 9) Using a water hose, add 6-1/2 gallons of water to the 30 gallon drum. Fill to the second mark from the bottom of the drum at 16-1/2 inches.
- 10) Using the hand pump equipped with gallon meter, pump 1-1/2 gallons of Envirostone liquid emulsifier into a bucket and add to the 30 gallon drum ingredients.
- 11) Place the air operated mixer in the 30 gallon drum and clamp it to the outside of the 55 gallon drum.
- 12) Start the mixer and mix for two minutes.
- 13) Slowly add 160 lbs. of Envirostone cement to 30 gallon drum with the mixer running.
- 14) Allow to mix for 10-15 minutes.
- 15) Stop mixer. Remove it from the drum.
- 16) Using the highlift, remove the completed 55 gallon drum from the catch basin and place it away from the work area.
- 17) Allow completed drum to cure for 24 hours before permanently sealing drum.
- 18) Repeat steps 3 through 16 to continue the solidification process.

3. Drum Packaging and Marking

a. Metal Operators, Production Control, will package the solidified solvents. The Operators shall:

Review Dates and Initials					
Prepared by	11-12-85		Reviewed by	11-12-85	
Supervisor	11/12/85		Manager, Production Control	11/12/85	

FUELS MANUFACTURING DEPARTMENT  
OPERATING PROCEDURES

Document No.

UNIT-M-57 DEV1

Procedure No.

0-411

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Date Issued

11-12-85

Supersedes

None

Title

SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS

Issued By

PRODUCTION CONTROL

- 1) Fill the remaining space in the 30 gallon inner drum with absorbent material.
- 2) Seal the 30 gallon drum with lid, lock ring, and bolt.
- 3) Fill the remaining space above the 30 gallon drum to the top of the 55 gallon drum with absorbent material.
- 4) Attach the lid, lock ring, bolt and lock nut to the 55 gallon overpack drum.
- 5) Torque the bolt and lock nut to 40 lbs. minimum.
- 6) Weigh each drum for gross weight.
- 7) Label each drum with the following information in the order given.

**NOTE:** All stenciling shall be 2" high, contrasting color to background, durable, water and corrosion resistant for the service life of the container.

a) Information stenciled on the lid of drum.

- (1) Point of Origin, "UNC/300".
- (2) Gross weight, "G.W. xxx lbs.".
- (3) Container I.D. number, "I.D.-SP-xxx".

b) Information stenciled on the side of drum.

- (1) Point of Origin, "UNC/300".
- (2) Gross weight, "G.W. xxx lbs.".
- (3) Container I.D. number, "I.D.-SP-xxx".
- (4) D.O.T. hazard class, "ORM-A".
- (5) D.O.T. shipping name, "Tetrachloroethylene".
- (6) D.O.T. Hazardous Material I.D. number, "UN 1897".

**NOTE:** If the gross weight exceeds 1120 lbs., the words, "Bottom Tier Only" must be stenciled to the side of the drum.

Review Dates  
and Initials

Prepared by

Supervisor

Reviewed by

W. Mandell

Approved by

Manager, Production Control

FUELS MANUFACTURING DEPARTMENT  
OPERATING PROCEDURES

Document No.

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Procedure No.

D-411

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Date Issued

11-12-85

Supersedes Issue Of

NEW

Title

SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS

Issued By

PRODUCTION CONTROL

8) Inspect each drum and for the following information:

- Drum identification number.
- Contents of drum.
- Gross weight.
- Date of operator inspection.

9) Complete a "Waste Control" form for each drum.

NOTE: The form will have an assigned number. This number shall be the container I.D. number.

10) Contact a Radiation Technician to survey the drum and complete their portion of the "Waste Control" form.

11) Attach the "Waste Control" form to the drum. See attachment III for example of "Waste Control" form.

12) Give the pink copy of the "Waste Control" form to the Supervisor, Production Control.

13) Transport the drum to an approved storage area designated by the Supervisor, Production Control.

4. Cleanup and Storage of Equipment Used in Solidification Process

a. A Metal Operator, Production Control, shall cleanup the work area.

He shall:

- Seal any open drums of waste solvent.
- Clean up the catch basin if any spills have occurred, using absorbent material.

NOTE: Any used absorbent material may be saved in a spare 30 gallon drum and later placed in a solidification drum with other absorbent material.

3) Clean mixer shaft to prevent hardening of material.

Review Dates  
and Initials

Prepared by

*Edl [Signature]*

Reviewed by

*J. Marshall* 11-12-85

Approved by

*[Signature]* 11/12/85  
Manager, Production Control

Supervisor

*[Signature]*

SAMPLE

UNC NUCLEAR INDUSTRIES

FUELS MANUFACTURING DEPARTMENT  
OPERATING PROCEDURES

Document No.

UNIT M-57 0517

Procedure No.

0-477

Page No.

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Date Issued

11-12-85

Supervisor

NCI

Title

SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS

Issued By

PRODUCTION CONTROL

- 4) Place the electric solvent pump and mixer in a spare 55 gallon drum.

WARNING:

A Radiation Technician must be contacted and a survey of personnel and equipment taken before leaving the radiation zone.

WP#0096P

Review Dates  
and Initials

Prepared by

*Bill Finner* 11/12/85

Reviewed by

*JK Marshall* 11-12-85

Approved by

*JK Marshall* 11/12/85  
Manager, Production Control

Supervisor

*JK Marshall* 11/12/85

# SAMPLE

UNC NUCLEAR INDUSTRIES

FUELS MANUFACTURING DEPARTMENT  
OPERATING PROCEDURES

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Supersedes Issue Dates  
NEW

Topic  
SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS

Issued By  
PRODUCTION CONTROL

ATTACHMENT I

CONDITIONAL RADIATION RELEASE

Instructions: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_ By: \_\_\_\_\_  
Radiation Monitoring  
SL-6700-133 (10-77)

(Actual size 2" x 4", yellow-in-color)

Review Dates  
and Initials

Prepared by *Bill Stearns* 11/12/85  
Supervisor *Jack Marshall* 11/12/85

Reviewed by  
*JK Marshall* 11-12-85

Approved by  
*Bill Stearns* 11/12/85  
Manager, Production Control

944329312071

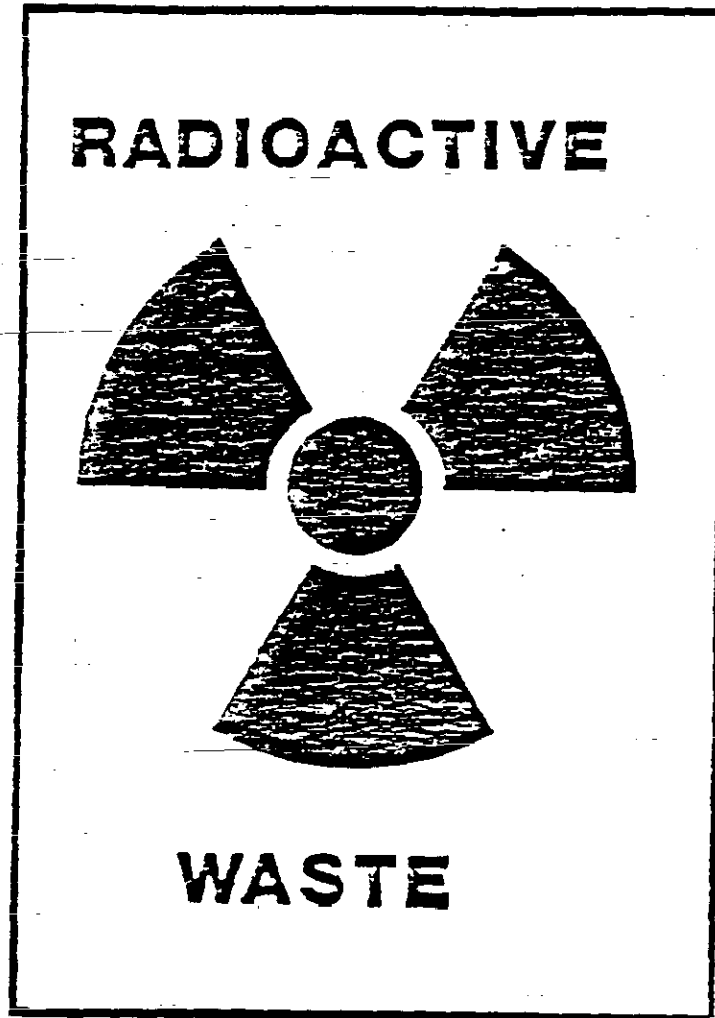
**SAMPLE**  
**UNION NUCLEAR INDUSTRIES**  
**FUELS MANUFACTURING DEPARTMENT**  
**OPERATING PROCEDURES**

Document No. UNI-M-57 REV1	
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**Title**  
**SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS**

**Issued By**  
**PRODUCTION CONTROL**

**ATTACHMENT II**



("Radioactive Waste" label, 5" x 7" in size)

Review Dates and Intervals					
Prepared by <i>CCP [Signature]</i> 11/17/85	Reviewed by <i>JL Marshall</i> 11-12-85	Approved by <i>[Signature]</i> 11/12/85	Manager, Production Control		
Supervisor <i>[Signature]</i> 11/12/85					

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9117293-2072

**UNC NUCLEAR INDUSTRIES**  
**FUELS MANUFACTURING DEPARTMENT**  
**OPERATING PROCEDURES**

Document No.  
**UNI-M-57 REV1**

Procedure No.  
**D-411**

Page No.  
**9 of 9**

Date Issued  
**11-12-85**

Supersedes Issue Cited  
**NEW**

Title  
**SOLIDIFYING AND PACKAGING OF WASTE SOLVENTS**

Issued By  
**PRODUCTION CONTROL**

**ATTACHMENT III**

Hazard Engineering Development Laboratory		WASTE MANAGEMENT		<input type="checkbox"/> HELL <input type="checkbox"/> PNL							
WASTE CONTROL											
Spec. No.	Rept. No.	Item No.	Type of Container	Volume (lit.)	Cost Code or Work Order No.						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3"> <b>FORM</b>  <input type="checkbox"/> Liquid    <input type="checkbox"/> Aerosol    <input type="checkbox"/> pH 8.021  <input type="checkbox"/> Solid    <input type="checkbox"/> Absorbent Liquid    <input type="checkbox"/> Dry Waste                         </td> <td colspan="3"> <b>VOLUME &amp; COMPOSITION</b>  <input type="checkbox"/> Organic    <input type="checkbox"/> Inorganic    <input type="checkbox"/> Transuranic (&gt; 10<sup>4</sup> Bq/gm)  <input type="checkbox"/> Radioactive    <input type="checkbox"/> Non-radioactive    <input type="checkbox"/> Other                         </td> </tr> </table>						<b>FORM</b> <input type="checkbox"/> Liquid <input type="checkbox"/> Aerosol <input type="checkbox"/> pH 8.021 <input type="checkbox"/> Solid <input type="checkbox"/> Absorbent Liquid <input type="checkbox"/> Dry Waste			<b>VOLUME &amp; COMPOSITION</b> <input type="checkbox"/> Organic <input type="checkbox"/> Inorganic <input type="checkbox"/> Transuranic (> 10 <sup>4</sup> Bq/gm) <input type="checkbox"/> Radioactive <input type="checkbox"/> Non-radioactive <input type="checkbox"/> Other		
<b>FORM</b> <input type="checkbox"/> Liquid <input type="checkbox"/> Aerosol <input type="checkbox"/> pH 8.021 <input type="checkbox"/> Solid <input type="checkbox"/> Absorbent Liquid <input type="checkbox"/> Dry Waste			<b>VOLUME &amp; COMPOSITION</b> <input type="checkbox"/> Organic <input type="checkbox"/> Inorganic <input type="checkbox"/> Transuranic (> 10 <sup>4</sup> Bq/gm) <input type="checkbox"/> Radioactive <input type="checkbox"/> Non-radioactive <input type="checkbox"/> Other								
<b>TYPE</b> <input type="checkbox"/> Plastic Pallet <input type="checkbox"/> Unlabeled <input type="checkbox"/> Transuranic (> 10 <sup>4</sup> Bq/gm) Radioactive    Non-radioactive    Radioactive    Non-radioactive Activity    mCi    Weight    g    Weight    kg											
*Type & Size of Container if not Standard _____ Weight _____ Pounds Signature of Person Sealing Container _____ Date _____ Print Name _____ Phone No. _____ Date _____											
<b>RADIATION SURVEY INFORMATION ON CONTAINER</b> Max Contam: <input type="checkbox"/> < 0.5 mCi/hr or _____ mCi/hr    or <input type="checkbox"/> < 0.5 mCi/hr or _____ mCi/hr Surface Contamination: <input type="checkbox"/> < 2200 dpm/100 cm <sup>2</sup> BETA-GAMMA <input type="checkbox"/> < 2200 dpm/100 cm <sup>2</sup> ALPHA Other: _____ Submitted by _____ Date _____											

(Actual size 8-1/2" x 5-1/2", 2 copies multicolored)

Review Dates  
 and Initials

Prepared by *[Signature]* 11/17/85  
 Supervisor *[Signature]* 11/12/85

Reviewed by *[Signature]* 11-12-85

Approved by *[Signature]* 11/12/85  
 Manager, Production Control

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BURIAL COMPLIANCE CHECKSHEET  
FOR RADIOACTIVE SOLID WASTE MATERIAL

SAMPLE

3-1A-7G-1

6-25 85

*TRP*

Rockwell Storage &  
Disposal Approval  
Number

Date

Rockwell Solid Waste  
Processing & Disposal  
Unit Approval Signature

Waste Generator: UNC Nuclear Industries

Waste Title: Non-Transuranic Contaminated Solidified Perchloroethylene

Storage/Disposal Container: DOT Spec 17C/17H Painted Steel 55 Gal Drum

Reference: EHO-MA-222, Rev. 2 (Unclassified), July 1984,  
D.F. Belgrair, "Hanford Radioactive Solid Waste  
Packaging, Storage and Disposal Requirements"

Waste Type: ☐ Classified ☒ Non-Transuranic  
☐ Transuranic WIPP Certified  
☐ Transuranic WIPP Un-Certified

Disposal  
Type: ☒ Scheduled ☐ Retrievable Storage  
☐ Non-Scheduled ☒ Contact Handled  
☐ One-Time Only ☐ Remote Handled  
☒ Direct Burial

Transport  
Criteria: ☐ U.S. Department of Transportation  
☒ Waste Generator  
☐ Rockwell Transport Approval Number: \_\_\_\_\_

Transport  
Category: ☒ Low Specific Activity ☐ Limited Quantity  
☐ Type A ☐ Type B ☐ Highway Route  
Controlled Quantity

9413293-2074

# A. WASTE DESCRIPTION

# SAMPLE

page 2 of 4

3-1A-7G-1  
Rockwell Storage &  
Disposal Approval  
Number

## 1. Waste Contents Included:

Yes	No	Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Miscellaneous Solid Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Tritium
<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Animal Carcasses	<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Alkali Metals
<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Unabsorbed Liquid Organics	<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Asbestos
<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Ion Exchange Columns	<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Lead Shielding
<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] DOT Class B Poison:	<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Gas Generating Potential
<input type="checkbox"/>	<input checked="" type="checkbox"/> [X] Heat Generating Potential (Greater than 0.1 watts/cf)	<input checked="" type="checkbox"/> [X]	<input type="checkbox"/> [ ] Hazardous Material Co-contamination
<input checked="" type="checkbox"/> [X]	<input type="checkbox"/> [ ] Other: <u>Solidified Perchloroethylene with Beryllium</u>		

Note: The following are prohibited: Free inorganic liquids, incompatible materials, pyrophorics, explosives, unreacted alkali metals, and unvented gas cylinders.

## 2. Physical Description of Waste:

Perchloroethylene and Beryllium solidified with U.S. Gypsum emulsifier and Envirostone.

## 3. Radionuclide Activity Description

Non-Transuranic: DOT Low Specific Activity concentrations of Uranium and Beryllium.

Transuranic: Less than 100 nCi/gram waste matrix.

## 4. Hazardous Material Co-contaminant Description: Perchloroethylene (Tetrachloroethylene) and Beryllium.

## 5. Maximum Allowable Fissile Quantity: Less than 1 gram/drum

## 6. Void Space Filler Material: Vermiculite, diatomite or other inert absorbent material.

9413293-2075

## B. WASTE PACKAGING SYSTEM

**SAMPLE**  
Page 3 of 4

3-1A-7G-1

Rockwell Storage &  
Disposal Approval  
Number

1. Container Name: DOT Spec. 17C/17H Painted Steel 55 Gal. Drum
2. Drawing or Specification Number: DOT Specification 17C/17H
3. External Dimensions: 24" OD x 35" H
4. Disposal Volume: 7.4 cf per container
5. Maximum Gross Weight: 1450 lbs.
6. General Description: Steel 55 gallon drum manufactured in accordance with DOT specification 17C or 17H with a gasketed lid. Lid locking ring bolt is torqued to 40 ft-lbs, and a lock nut is installed.
7. Required Internal Packaging: Solidification mixture may be placed directly in 5-to-30-gallon steel containers. These containers are sealed and surrounded within a 55 gallon drum by absorbent material and the drum sealed.
8. Closure Mechanism: Gasketed lid with locking ring.
9. Maximum Allowable Radiation Levels: Less than 200 mR/hr (Contact)  
N/A (Other)
10. Maximum Allowable Surface Contamination: Less than 220 d/m/100-sq cm alpha  
Less than 2200 d/m/100-sq cm beta-gamma
11. Required Labels:
- Top and side: Point of Origin (eg. UNC 300)
  - Top and side: Gross Weight (eg. GW XXX LBS)
  - Side only: Radioactive
  - Side only: "BOTTOM TIER ONLY" (Only required if gross weight is 1120 lbs or greater)
  - Side only: Additional DOT Hazard Class (eg. ORM-A)
  - Side only: Additional DOT Proper Shipping Name (eg. Tetrachloroethylene)
  - Side only: Additional DOT Hazardous Material ID Number (eg. UN 1897)

9403293-2076

7-18-76-1  
Rockwell Storage &  
Disposal Approval  
Number

12. Returnable Transport Overpacks: None.

Note: The Waste Generator must send a current Certificate of Compliance (COC) and Safety Analysis for Packaging (SASP) for each type of Returnable Transport Overpack to Rockwell prior to the initial shipment and each time these documents are revised.

### C. OTHER REQUIREMENTS

1. Administrative Controls: None.

- (1) Solidification method shall be as follows:  
Blend 1/2 gallon of water and 3/4 to 1 pint of U.S. Gypsum emulsifier to each 1 gallon of Perchloroethylene to form a uniform emulsion. Add 10 to 11 pounds of Envirostene per each gallon of perchloroethylene with continuous mixing. Allow mixture to cure for 24 hours before sealing drum.

2. Rockwell Storage/Disposal Instructions:

- (1) Waste may be handled by forklift and stacked.

BURIAL COMPLIANCE CHECKSHEET  
FOR RADIOACTIVE SOLID WASTE MATERIAL

SAMPLE

3-1A-7L-1

01-21-86

Rockwell Storage &  
Disposal Approval  
Number

Date

Rockwell Solid Waste  
Processing & Disposal  
Unit Approval Signature

Waste Generator: UNC Nuclear Industries

Reference letter #29464 dated 12-16-85

Waste Title: Low Level Solidified Mixed Chemical Waste

Storage/Disposal Containers: DOT Spec 17C/17H Painted Steel 55 Gal. Drum

Reference: RHO-MA-222, Rev.3 (Unclassified), August 1985,  
T.R. Pauly, "Hanford Radioactive Solid Waste  
Packaging, Storage and Disposal Requirements"

Waste Type: ☐ Transuranic

☒ Low Level

☒ Unclassified

☐ Classified

Disposal  
Type:

☒ Burial

☐ Retrievable Storage

☒ Scheduled

☒ Contact Handled

☐ Routine

☐ Remote Handled

☐ One-Time Only

Transport  
Criteria:

☐ U.S. Department of Transportation

☒ Waste Generator

☐ Rockwell Transport Approval Number: \_\_\_\_\_

Transport

Category:

☒ Low Specific Activity

☐ Limited Quantity

☒ Type A

☐ Type B

☐ Highway Route  
Controlled Quantity

9413293.2078

## A. WASTE DESCRIPTION

SAMPLE

3-1A-75-1

Rockwell Storage &  
Disposal Approval  
Number

## 1. Waste Contents Included:

Yes	No	Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Miscellaneous Solid Waste		Tritium (>20 mCi/M <sup>3</sup> )
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Animal Carcasses		Alkali Metals
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Unabsorbed Liquid Organics		Asbestos
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Ion Exchange Columns		Lead Shielding
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Significant Concentrations Of C-14, Kr-85, Tc-99, I-129		Gas Generating Potential
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Heat Generating Potential (Greater than 0.1 watts/cf)		Radioactive Mixed Waste
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Other: <u>Solidified Mixed Chemical Waste</u>		

Note: The following are prohibited: Free inorganic liquids, incompatible materials, pyrophorics, explosives, unreacted alkali metals, and unvented gas cylinders.

## 2. Physical Description of Waste:

Ethyl acetate and bromine solidified in small metal containers.

## 3. Radionuclide Activity Description

Non-Transuranic: DDT Low Specific Activity concentrations  
of various radionuclides including uranium.

Transuranic: Less than 100 nCi/gram waste matrix.

## 4. Radioactive Mixed Waste Hazardous Constituent Description:

Perchloroethylene, trichloroethylene, trichloroethane, ethyl acetate and bromine.

## 5. Maximum Allowable Fissile Quantity: Less than 1 gram/drum.

## 6. Void Space Filler Material: Soil, vermiculite, or other inert materials.

3-1A-7L-1  
Rockwell Storage &  
Disposal Approval  
Number

# SAMPLE

1. Container Name: DOT Spec. 17C/17H Painted Steel 55 Gal. Drum
2. Drawing or Specification Number: DOT Specification 17C/17H
3. External Dimensions: 24" OD x 35" H
4. Disposal Volume: 7.4 cf per container
5. Maximum Gross Weight: 900 lbs.
6. General Description: Steel 55 gallon drum manufactured in accordance with DOT specification 17C or 17H with a 4 mil (nominal) or thicker polyethylene liner and a gasketed lid. Lid locking ring bolt is torqued to 40 ft-lbs, and a lock nut is installed.
7. Required Internal Packaging: Solidification mixture may be placed directly in 1 to 30 gallon steel containers and then sealed. This steel container is then transferred into the polyethylene lined 55 gallon drum. Absorbent material (diatomaceous earth) is next added to fill the void spaces within the polyethylene lined drum. The liner and drum are then sealed.
8. Closure Mechanism: Gasketed lid with locking ring.
9. Maximum Allowable Radiation Levels: Less than 200 mR/hr (Contact)  
N/A (Other)
10. Maximum Allowable Surface Contamination: Less than 220 d/m/100 sq cm alpha  
Less than 2200 d/m/100 sq cm beta-gamma
11. Required Labels:
- Top and side: Point of Origin (eg. UNC 300)
  - Top and side: Gross Weight (eg. GW XXX LBS)
  - Side only: Radioactive Materials (DOT or equivalent)
  - Side only: Additional DOT Hazard Class label for Corrosive Material
  - Side only: EPA Hazardous Waste Stickers as required:
    - "F003, WT02, Ethyl Acetate"
    - "D002, DW, Bromine Solution"
    - "U210, Perchloroethylene"
    - "U228, Trichloroethylene"
    - "U226, Trichloroethane"
- Use the BCC number for the Manifest Document No.

9413293.2050

SAMPLE

page 4 of 4

3-1A-74-1  
Rockwell Storage &  
Disposal Approval  
Number

12. Returnable Transport Overpacks: None.

Note: The Waste Generator must send a current Certificate of Compliance (COC) and Unloading and Handling Procedures for each type of Returnable Transport Overpack to Rockwell prior to the initial shipment and each time these documents are revised.

C. OTHER REQUIREMENTS

1. Administrative Controls:

- (1) The chemical waste mixtures shall be completely solidified and inspected after the curing time for any leached fluid. No free liquids shall be allowed.
- (2) Individual Solid Waste Burial Record-Low Level forms are required for each drum. The composition of the waste in volume % shall be indicated.
- (3) The name of the hazardous constituents and quantity present must be identified on each corresponding Solid Waste Burial-Record-Low Level form.
- (4) The chemicals forming the mixture shall be compatible, that is, must not react dangerously with each other, be decomposed by or ignited by the contaminated waste.

2. Rockwell Storage/Disposal Instructions:

- (1) Waste may be handled by forklift and stacked.



Rockwell Hanford Operations

SOLID WASTE BURIAL RECORD - LOW LEVEL

USE BLACK BALL POINT PEN OR TYPE

## DISPOSAL SITE

This portion of form is controlled by  
Rockwell Representative at Disposal Site.

WASTE GENERATOR: LNC

Area

200 WEST

Burial Ground No.

218 W 3 AC

Trench No.

10E

Caisson No.

N/A

Beginning Coordinates

N 45804 W 74627

Ending Coordinates

N 45804 W 74635

Remarks

10E

Signature - Acceptance

Bruce A. Rogers

Date

2-28-1986

Signature - Burial

Date

Charge Code

U3-P6-W-090

DOE Authorization No.

(RAM) N/A

Address/Phone

313/300 Area  
376-3518

- I certify that: 1. No capital property is included in this burial unless documented by a Property Disposal Request and described below.  
2. The waste package description below is complete and the waste package conforms to RHO-MA-222 and the approved Burial Compliance Checksheet (BCC).  
3. The charge code is correct.

Signature

2-28-86  
Date

## WASTE DESCRIPTION

## COMBUSTIBLE MATERIALS

## NONCOMBUSTIBLE MATERIALS

Paper Products

%

Glass

%

Plastic

%

Concrete

%

Cloth

%

Stainless Steel

%

Rubber

%

Other Metals

20%

%

ALS-ebant

20%

%

Solid Solvent

60%

%

%

Total

%

Total

100%

## HAZARDOUS/CORROSIVE CONSTITUENTS

Name

Quantity (Lb or Kg)

Perchloroethylene

7,980 lbs

Trichloroethylene

1,995 lbs

## CONTAINER INFORMATION

Quantity &amp; Name

57 55 Gallon  
DrumsHanford Standard  
Fiberboard Boxes  
(18" x 18" x 24")

Other:

BCC Approval Number

3-1A-7L-1

Dose Rate - Package

4.5 mrem/hr at Contact

Diameter or Length x Width

24" x 0"

Height

35"

Material of Construction

Steel

Nuclear Transaction No.

N/A

Property Disposal Request No.

N/A

Total

Volume 427.5

Gross Weight 34,200 Pounds

Kilogram

## WASTE CATEGORIES:

- ☐ BW ☒ DS  
☐ CE ☐ SS  
☐ DD ☐ NC

Remarks:

86-W-090

Thermal Power:

- ☒ 0.1 w/ft<sup>3</sup> or less  
Other

## RADIOACTIVE MATERIAL CONTENT

## TRANSURANIC AND URANIUM

## NONTRANSURANIC

Element

Isotopic Distribution (Wt %)

Total  
Element  
Weight

Isotope

Grams  
or  
Curies

U 235

.95

4.30gms

NONE

NONE

U 238

99.05

449.29gms

Totals

453.59gms

NONE

Measurement Method:

Calculation

Determined By:

J. M. Bishop

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UNC NUCLEAR INDUSTRIES

SAMPLE

INDUSTRIAL SAFETY MANUAL

Document No. UNI-M-38	Control No. 110
Date Issued 6-85	Page No. 3 of 3
Supersedes Issue Date 12-83	

Subject HAZARDOUS WORK PERMITS	Issued By INDUSTRIAL SAFETY
-----------------------------------	--------------------------------

APPENDIX A

Area 300 Bldg. 394A Date 3-4-86 Shift Night

Description of Job \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Associated Hazards

<u>Yes</u> toxic chemicals	<u>No</u> one person lifting over 90 lbs.
<u>No</u> electrical	<u>No</u> elevated work area
<u>No</u> flammables/explosives	<u>Yes</u> high temperature
<u>No</u> confined space	<u>No</u> excavation
<u>No</u> asbestos	<u>Yes</u> hazardous atmosphere
	<u>Yes</u> other _____

Protective Equipment Requirements

<u>Yes</u> canvas gloves	<u>Yes</u> shoe covers	<u>Yes</u> ear protection
<u>Yes</u> rubber gloves	<u>Yes</u> rubber boots	<u>Yes</u> full face mask
<u>Yes</u> coveralls	<u>Yes</u> chemical goggles	<u>Yes</u> supplied air resp.
<u>Yes</u> acid suit	<u>Yes</u> face shield	<u>Yes</u> safety belt/harness
<u>Yes</u> hood	<u>Yes</u> safety glasses	<u>Yes</u> other _____

Special Instructions:

Approvals:

W R Peterson  
Job Supervisor

P. H. Hord 3/3/86  
Industrial Safety

Signatures of  
Personnel Assigned

Name	PR #	Date(s) worked
<u>David L. Hord</u>	<u>55772</u>	<u>3-4-86</u>
<u>11111111</u>	<u>54711</u>	<u>3/4/86</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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# FUELS MAINTENANCE WORK AUTHORIZATION 030

**SAMPLE**

Job Title

Disposition of Solvent Evaporator

Date

10/30/85

W.A. No.

85-2510

Originator

J. K. Marshall

Section

Process Engineering

Building

37070

Description Of Work: The load lugger which was used as the waste solvent evaporator; located east of the 334 building, needs to be cut up and placed in a 4' x 4' x 8' burial box to be supplied by Production Control.

**CAUTION:** The high temperatures involved in cutting the load lugger may break down the chlorinated solvents into phosgene gas. See attached Hazard analysis for special instructions.

How Discovered:

Cost Center

HF-660

Activity Task

FE-02

J.R. No.

U-09528

Equipment No.

301500

OAL

I

Priority

1

20

Procedure No.

FEALVS-5 (ATTACHED)

REVIEWED BY:

APPROVED BY:

Fuels Engineering

J. K. Marshall

Industrial Safety

Leber...

Fuels Quality Assurance

...

Other

N/A

Fuels Maintenance

W. H. Clark 12-17-85

Fuels Production/Production Control Supervisor Signatures:

Material Location:

Equipment Released

N/A

Equipment Accepted

J. K. Marshall 3-5-86

Bldg. No.

Bin No.

Name Date

Name Date

Tagout No.:

Fuels Prod./Prod. Control

Fuels Maintenance

Name Date

Name Date

N/A

N/A

Name Date

Name Date

Name Date

Name Date

Work That Was Done:

Explain:

CUT UP LOAD LUGGER + ALUMINUM LID FOR DISPOSAL. Done 3-4-86

ASSISTED HANDLING OF CUT UP PIECES PHOSGENE

UPRGAAS

How Failed:

Post Repair Testing Requirements:

CONTACT J. K. MARSHALL FOR ACCEPTANCE

Work Completed:

Fuels Maintenance Supervisor Signatures:

Name:

W. H. Clark

Date:

3-5-86

Name:

Date:

Name:

Date:

## SAFETY ANALYSIS CHECKLIST

WA 85-257

Document or Procedure Number and/or

Title:

Disposition of Solvent Evaporator

SAMPLE

Location: Adjacent to 334 Building

Description of Job: Cut up the load lugger used for storage of waste solvent and place in a 4' x 4' x 8' burial box.

## RISK LEVEL EVALUATION

	Minor (Control Factor 1-7)	Moderate (Control Factor 1-4)	Major (Control Factor 1-2)
Personal Injury		2	
Equipment Damage	NA		
Violation of Nuclear Safety Specification	NA		
Fire from Pyrophoric Metals	NA		
Environmental Release	NA		

Specific Hazards Identified:

Evaluator: J. K. Marshall JK Marshall

Date: 11/1/85

Approvals: KG Cal

Date: 11/8/85

Date:

Date:

Date:

## HAZARD ANALYSIS CHECKLIST

SAMPLE

Document or Procedure Number and/or  
Title:

Disposition of Solvent Evaporator

Location: Adjacent to 334 Building

Description of Job: Cut up the load lugger used for storage of waste solvent  
and place in a 4' x 4' x 8' burial box.

## Potential Associated Hazards\*

toxic chemicals release	<u>Yes</u> (1)	radiological work	<u>No</u> (2)
flammables/explosives	<u>No</u>	high temperature	<u>Yes</u> (3)
asbestos material	<u>No</u>	hazardous atmosphere	<u>Yes</u> (1)
nuclear safety	<u>No</u>	pyrophoric material	<u>No</u>
solid, liquid or gaseous release to the environment	<u>Yes</u> (1)	Electrical Shock	<u>No</u>
rotating equipment	<u>No</u>	Use of Compressed Air Welding (eye protection)	<u>No</u>

\*Indicate "Yes" or "No" for each hazard item. If "Yes" the special instruction section shall indicate how that hazard is to be controlled.

## Special Instruction: (Including Protective Clothing Requirements)

(1) See attached sheet. (2) Radiation Monitoring has investigated and ruled that an RWP is not necessary. (3) Use proper caution in operation of cutting torch.

Hazard Level Evaluator J. K. Marshall

Date: 11/1/85

Approval: *[Signature]*

Date: 11/8/85

Section Manager

9413293.2086

Hazard Analysis Checklist, Page 4

SAMPLE

- (1) Although the solvent evaporator has been cleaned as thoroughly as possible, some residual perchloroethylene and 1, 1, 1- trichloroethane most likely is present on the load lugger. These solvents can break down at high temperatures into phosgene, a poisonous gas. To protect the cutting torch operator, a full face hood with supplied air is required.

A Rockwell safety group at 200W area has been contacted that can supply a fresh air hood with a welding visor attachment. Since a specific hose type and air pressure is required to use with this hood, Rockwell will also supply an air bottle and cart. Please call one of the Rockwell safety engineers at 3-3761 to schedule use of this system. They will deliver it and provide instruction on its use.

T.E.

INTERNAL

WORK ORDER

320°/HR - 1 MAN

OJT

9413293-2887



# TITLE DISPOSITION OF SOLVENT EVAPORATOR W/A NO. 85-251

PETERSON 3-3

## SAMPLE

RESPONSIBLE PARTY

PROCEDURES REQUIRED

ENGINEER

EFDA N/A

FRRR FORM N/A

PLANNING & SCHEDULING/  
ENGINEERING

DETAILED WORK SEE HAZARD ANALYSIS  
PROCEDURES SEE HAZARD ANALYSIS

SUPERVISOR

TAG OUT N/A

RWP N/A

HAZARD ANALYSIS YES ATTACHED

B & PERMIT N/A

BURNING/WELDING PERMIT YES

WELD ROD SLIP N/A

MAINT. ANALYST  
(ROUTE FOR APPROVALS  
ONLY)

EXCAVATION PERMIT N/A

QUALITY ASSURANCE

\* HOLD POINTS NO N/A 12-11-85

\* INSPECTION SHEET NO N/A 12-11-85

### MATERIALS REQUIRED

FM MATERIALS

CERTS REQUIRED N/A

ACCEPTANCE DOCUMENTS N/A

(GREEN TAGS)

QUALITY ASSURANCE

SPECIAL HANDLING

\* REQUIRES QA DETERMINATION

PLANNING & SCHEDULING  
SIGNATURE

DATE

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BURIAL COMPLIANCE CHECKSHEET  
FOR RADIOACTIVE SOLID WASTE MATERIAL

**SAMPLE** *Davis*

3-58-1A-1  
Rockwell Storage &  
Disposal Approval  
Number

Rockwell Solid Waste  
Processing & Disposal  
Unit Approval Signature

Waste Generator: UNC NUCLEAR INDUSTRIES  
Reference Letter # N/A Dated            File #15

Waste Title: Low Level Miscellaneous Radioactive Solid Waste

Storage/Disposal Container: UNC 4x4x8 Plywood Box

Reference: RHO-MA-222, Rev. 3 (Unclassified), August, 1985,  
T. R. Pauly, "Hanford Radioactive Solid Waste  
Packaging, Storage and Disposal Requirements"

Waste Type: ☐ Transuranic ☒ Low Level  
☒ Unclassified ☐ Classified

Disposal Type: ☒ Burial ☐ Retrievable Storage  
☒ Scheduled ☒ Contact Handled  
☐ Routine ☒ Remote Handled  
☐ One-Time Only

Transport Approval: ☐ U.S. Department of Transportation  
☒ Waste Generator  
☐ Rockwell Transport Approval Number:           

Transport Category: ☒ Low Specific Activity ☒ Limited Quantity  
☒ Type A ☐ Type B ☐ Highway Route  
Controlled Quantity

6802962916  
9413293.2089

3-58-1A-1  
Rockwell Storage &  
Disposal Approval  
Number

# SAMPLE

## 1. Waste Contents Included:

Yes	No	Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Miscellaneous Solid Waste		Tritium ( >20 mCi/cu. M)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Animal Carcasses		Alkali Metals	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Unabsorbed Liquid Organics		Asbestos	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ion Exchange Resins		Lead Shielding	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Significant Concentrations of C-14, Kr-85, Tc-99, I-129		Gas Generating Potential	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Heat Generating Potential (Greater than 0.1 watts/cu. ft.)		Radioactive Mixed Waste	
<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Other: _____			

Note: The following are prohibited: Free inorganic liquids, incompatible materials, pyrophorics, explosives, unreacted alkali metals, and unvented gas cylinders.

2. Physical Description of Waste: May include asbestos and miscellaneous solid radioactive waste including paper, cloth, plastic (polyethylene, wood, steel concrete, soil, piping, tools, ductwork, etc)

## 3. Radioactive Material Description

Non-Transuranic: Up to and including DOT Type A quantities of various radionuclides including mixed activation and fission products.

Transuranic: Less than 100 nCi/gram waste matrix.

## 4. Radioactive Mixed Waste Hazardous Constituent Description:

None

5. Maximum Allowable Fissile Quantity: 15 grams per container.

6. Void Space Filler Material: Soil, vermiculite or other inert material.

0602572616  
#17297.2090

Rockwell Storage &  
Disposal Approval  
Number

# SAMPLE

1. Container Name: UNC 4'x4'x5' Plywood Box
2. Drawing or Specification Number: H-1-42701
3. External Dimensions: 8' L x 4' W x 4'5-1/2" H
4. Disposal Volume: 143 cu ft per container
5. Maximum Gross Weight: 2000 lbs
6. General Description: Wooden box constructed of 3/4" fire-retardent plywood with 2x4 inner framing and glued and nailed joints, and 1 1/4" wide steel banding. Box is mounted on 4x4 wood skids for forktruck handling.
7. Required Internal Packaging: None required.
8. Closure Mechanism: Box lid is glued and nailed in place, and steel banding is installed.
9. Maximum Allowable Radiation Levels: Less than 200 mR/hr (Contact)  
Single points to 1 R/hr with (Other)  
Administrative controls on page 4
10. Maximum Allowable Surface Contamination: Less than 220 d/m/100 sq cm alpha  
Less than 2200 d/m/100 sq cm beta-gamma
11. Required Labels:
  - Top and side: - Point of Origin (eg. UNC 100N)
  - Gross Weight (eg. GW XXX lbs)
  - Side only: - Dot or equivalent "Radioactive Material"
  - Container ID (eg. H-1-42701)
  - Grams Fissile Material (only required if 1 gram or more is present)

16025623116  
9413293.209

Rockwell Storage &  
Disposal Approval  
Number

# SAMPLE

11. Required Labels (continued) If asbestos is present mark 2 sides with

CAUTION

Contains Asbestos  
Avoid Opening or  
Breaking Container  
Breathing Asbestos is Hazardous  
to your Health

12. Returnable Transport Overpacks: None

## C. OTHER REQUIREMENTS

### 1. Administrative Controls:

- (1) The container shall be inspected to assure there has been no breach of containment during loading.
- (2) Containers with "hot spots", i.e., greater than 200 mR/hr and up to 1 R/hr, on one side and/or container bottom must have hot spots on sides marked, and container shall be loaded such that side with hot spots remains opposite from fork-truck operator during unloading.
- (3) Containers with hot spots on more than one side shall be pre-rigged for crane unloading and shall not be sent in the same shipment with forktruck unloaded or other contact handled containers.
- (4) Rockwell shall be notified of containers with hot spots during scheduling for disposal.
- (5) A single Solid Waste Burial Record-Low Level form (Rockwell form 54-3000-534) may be used for containers with like content in the same shipment.

### 2. Rockwell Storage/Disposal Information

- (1) Waste may be handled by forktruck or crane (depending upon radiation levels) and may be stacked.
- (2) Use other containers to shield those with hot spots.
- (3) Sackfilling should be completed prior to accumulating 190 grams fissile material in the trench or as required by applicable procedures and specification.

44-3893-2092

# SAMPLE

Rockwell Hanford Operations

SOLID WASTE BURIAL RECORD - LOW LEVEL

37

RCR 47034

USE BLACK BALL POINT PEN OR TYPE

SWBR NO. 313-LNC-86-4

## DISPOSAL SITE

This portion of form to be completed by Rockwell Representative at disposal site.

Area 200 W Burial Ground No. 3-A-E Trench No. 5-E  
 Cesium No. N/A Beginning Coordinates N 46186 W 76592  
 Ending Coordinates N 46186 W 76600

Remarks

Signature - Acceptance A.E. Dugan Date 7-11-86  
 Signature - Burial R.W. Liden Date 7-14-86

## WASTE GENERATOR:

Charge Code 43-PL-W-237 DOE Authorization No. N/A  
 Address/Phone 313/300 Area 376-3518

I certify that: 1. No capital property is included in this burial unless documented by a Property Disposal Request and described below.  
 2. The waste package description below is complete and the waste package conforms to RHO-MA-222 and the approved Burial Compliance Checksheet (BCQ).  
 3. The charge code is correct.

Signature J. M. Bishop Date 7-11-86

## WASTE DESCRIPTION

COMBUSTIBLE MATERIALS		NONCOMBUSTIBLE MATERIALS	
Paper Products	10 %	Glass	%
Plastic	20 %	Concrete	%
Cloth	%	Stainless Steel	%
Rubber	%	Other Metals	20 %
Wood	40 %	Absorbent	10 %
	%		%
	%		%
	%		%
Total	70 %	Total	30 %

## HAZARDOUS/CORROSIVE CONSTITUENTS

Name	Quantity (Lb or Kg)
<u>N/A</u>	<u>N/A</u>

## CONTAINER INFORMATION

Quantity & Name 55 Gallon Drums Hanford Standard Fiberboard Boxes (18" x 18" x 24")

10 ea Other: 4' x 4' x 8' Burial Box

BCQ Approval Number 3-58-1A-0 Dose Rate - Package ≤ 5 mrem/hr at Contact

Diameter or Length x Width 4' x 8' Height 4'

Material of Construction PLY wood

Nuclear Transaction No. N/A Property Disposal Request No. 86-577

Total Volume 1,250 cu ft Gross Weight 20,000 ☒ Pounds ☐ Kilogram

## WASTE CATEGORIES:

☐ BW ☒ CS  
☐ CE ☐ SS  
☐ DD ☐ NC

Thermal Power: ☒ 0.1 w/ft<sup>3</sup> or less ☐ Other

Remarks: Change this burial to W.O.T. B27580-FN01

## RADIOACTIVE MATERIAL CONTENT

TRANSURANIC AND URANIUM			NONTRANSURANIC	
Element	Isotopic Distribution (Wt %)	Total Element Weight	Isotope	Grams or Curies
<u>U 235</u>	<u>.95</u>	<u>4.3 gms</u>	<u>NONE</u>	<u>NONE</u>
<u>U 238</u>	<u>99.05</u>	<u>449.25 gms</u>		

Totals 453.59 gms NONE

Measurement Method: Calculations Determined By: J. M. Bishop

DISTRIBUTION: White - SWPOU 2750-E/200 E Green - TES 272-W/200 W

54-3000 581 (7)

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APPENDIX E

SOIL AND CONCRETE SAMPLING AND ANALYSIS PLAN  
FOR THE 300 AREA SOLVENT EVAPORATOR

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45	E-1.	The 300 Area Solvent Evaporator Analytes and	
46		Performance Standards . . . . .	APP E-5
47	E-2.	Solvent Evaporator Inductively Coupled Plasma-Atomic	
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51		Summary Table - Number of Soil Samples and Blanks . . . . .	APP E-25
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53		the 300 Area Solvent Evaporator . . . . .	APP E-27

## APPENDIX E

SOIL AND CONCRETE SAMPLING AND ANALYSIS PLAN  
FOR THE 300 AREA SOLVENT EVAPORATOR

## E-1 INTRODUCTION

The Soil and Concrete Sampling and Analysis Plan for the 300 Area Solvent Evaporator (300 ASE) has been designed for the assessment of contamination of surface or near-surface soils and an adjacent concrete pad that originated from the 300 ASE and attendant barrel storage operations. The 300 ASE treated radioactively contaminated dangerous wastes and thus was a mixed-waste treatment and storage facility. The location of the 300 ASE closure area and proximity to other 300 Area facilities are shown in Figures E-1 and E-2. The closure area consists of a part of the concrete pad (333 East pad) adjoining the 333 Building and the soil immediately adjacent to the south end of this concrete.

The 300 ASE operated prior to the effective date of the RCRA regulations. Operations associated with the facility ceased and the evaporator was dismantled prior to the first formal interpretive guidance clarifying the applicability of RCRA to mixed wastes. The specific data/documentation requirements of either RCRA or Ecology's *Dangerous Waste Regulations*, WAC 173-303 (Ecology 1991), were not implemented while operating or dismantling the 300 ASE. In accordance with the procedures identified in Appendix D, the 300 ASE was dismantled and buried.

## E-1.1 CLOSURE STRATEGY

The data generated through implementation of this plan will be used to assess the extent of contamination in the closure area that is attributable to the 300 ASE. Based on the evaluation of these data, the facility will be either clean closed under RCRA or closed in conjunction with the Remedial Investigation/Feasibility Study of Operable Unit 300-FF-2 under CERCLA.

Remedial action for the 618-1 Burial Ground underlying the 300 ASE closure area, at a depth of approximately 4 feet, will be evaluated as part of the 300-FF-2 Operable Unit. The 618-1 Burial Ground was operated from 1944 to 1951 as a low-level radioactive solid waste burial ground which received uranium, other metallic and non-metallic materials, and incidental laboratory wastes.

## E-1.2 GENERAL SAMPLING STRATEGY

The strategy for sampling and analysis of both the soil and the concrete has been based on assessments of potential waste discharges using historical information on the storage of spent solvent on the concrete pad, and on the only known spill (onto the soil). Assessments of hypothetical waste discharges have been developed using the physical characteristics of the waste

## 300 AREA SOLVENT EVAPORATOR UNIT

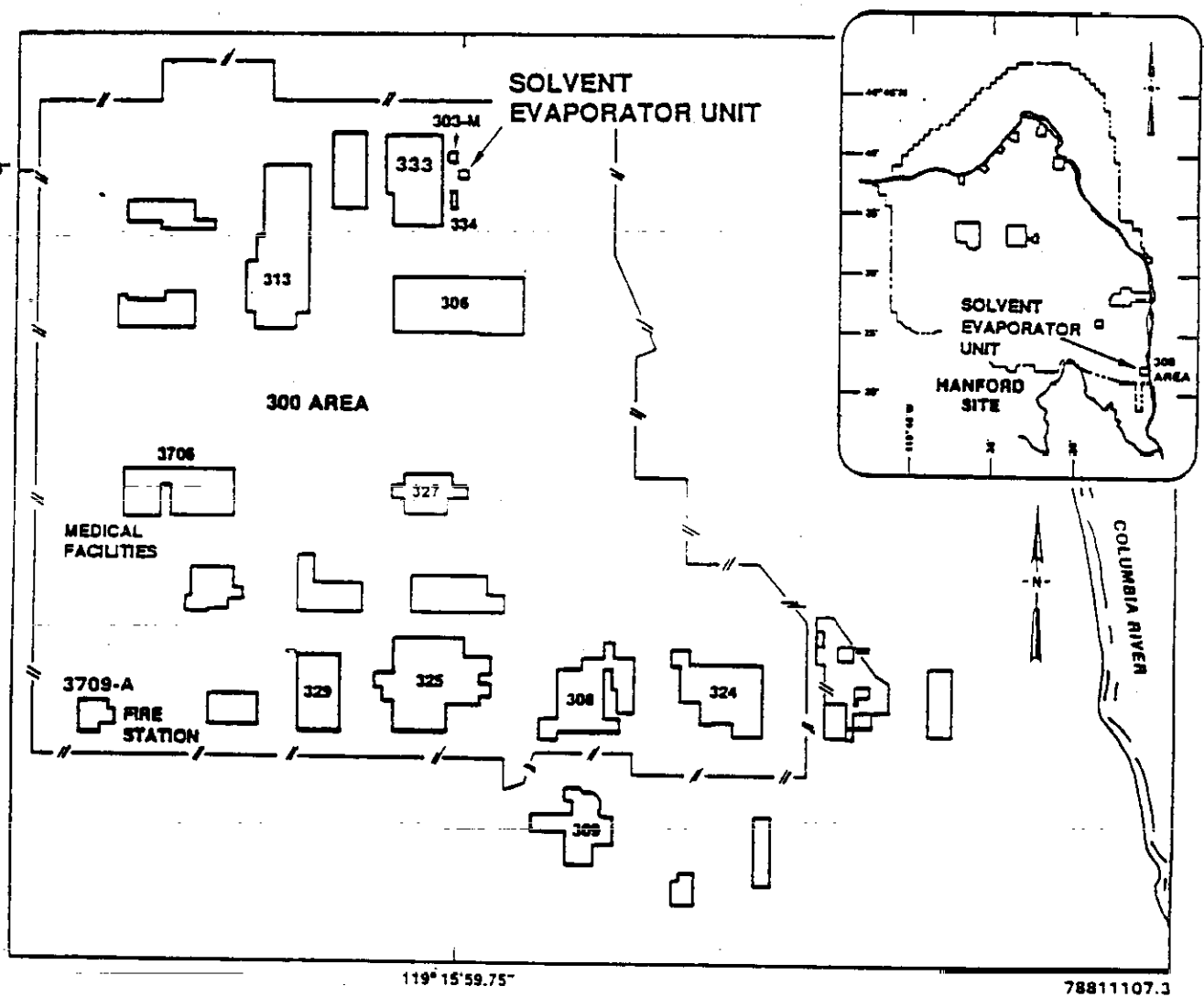
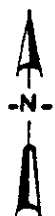
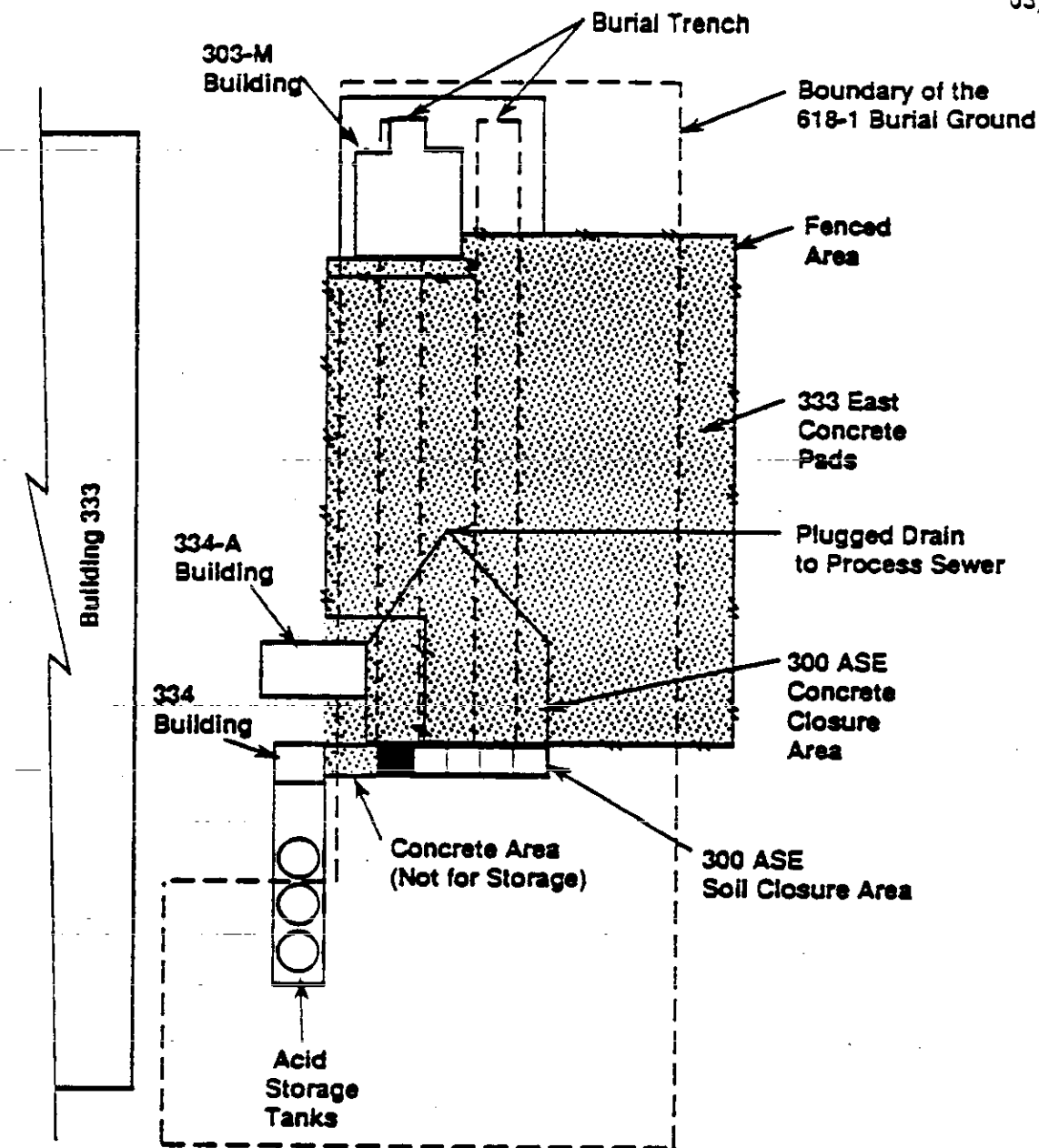


Figure E-1. 300 Area Solvent Evaporator. (78811107.3)



0 10 20 30 40 50 ft

■ Last Location of 300 ASE and Spill Site

(2-5-90)  
78911137.4

Figure E-2. Layout of 300 Area Solvent Evaporator Closure Area and 618-1 Burial Ground.  
(78911137.4)

1 constituents, weather conditions, known properties of the soil and concrete,  
2 and the time and location of the known spill (Section E-2). It has been  
3 deduced from the most liberal assessment that none of the 300 ASE volatile  
4 constituents should now be present either in the soil or in the concrete.  
5 This conclusion is, therefore, the technical basis for performing verification  
6 sampling of both the soil and concrete.

#### 9 E-1.2.1 Soil Analytes

11 Soil analysis will be largely confined to known and suspected waste  
12 constituents associated with the 300 ASE. This rationale is justified by the  
13 uncertainties associated with the nature of the 618-1 Burial Ground soil  
14 cover, the unknown impact of wastes from the underlying 618-1 Burial Ground,  
15 and the potential for contamination from other adjacent operations in the  
16 immediate area. These waste constituents can be grouped into the following  
17 four categories.

- 19 1. Solvents and organic compounds known to be treated in the evaporator.
- 21 2. Organic degradation products of the primary organic compounds.
- 23 3. Inorganic constituents from the degreasing of fuel element materials.
- 25 4. Inorganic constituents that may have been treated in the evaporator via  
26 paint in conjunction with paint solvent.

28 The specific constituents associated with these four categories are  
29 listed in Table E-1. Inorganic constituents having concentrations at or below  
30 detection limits in the analysis of the raw waste solvent (Table E-2) are  
31 omitted from the list of constituents to be analyzed. The elements silicon,  
32 aluminum, iron, calcium, sodium, and phosphorous also are excluded because  
33 they are primary constituents in native rocks and soils and occur at  
34 concentrations far in excess (1,000 to 500,000 micrograms per gram) of those  
35 in the raw waste (less than 100 micrograms per gram). All additional organic  
36 constituents obtained by Methods 8210 or 8240 and 8270 (SW-846) (EPA 1986)  
37 will be reported since they are measured concurrently in the analysis and can  
38 be used in CERCLA (1980) characterization efforts. Thus, compliance with RCRA  
39 regulations will be verified using the constituents listed in Table E-1. The  
40 presence of the additional organic constituents (other than those listed in  
41 Table E-1) from the closure area and baseline samples, will be regarded as  
42 originating from the underlying 618-1 Burial Ground or other operations in the  
43 300 Area. Likewise, elevated concentrations of inorganic constituents in  
44 baseline samples will be interpreted as originating from other sources. Any  
45 remedial actions for non-300 ASE contaminants will be evaluated in conjunction  
46 with the Remedial Investigation/Feasibility Study of Operable Unit 300-FF-2.



Table E-1. The 300 Area Solvent Evaporator Analytes and Performance Standards.

Category-Constituent	Initial action level		Alternative action level	
	Soil	Concrete	Soil	Concrete
1- 300 ASE primary organic constituents				
Perchloroethylene (PCE)	a	b	c	c
1,1,1-trichloroethane (TCA)	a	b	c	c
Trichloroethylene (TCE)	a	b	c	c
Methyl ethyl ketone (MEK)	a	b	c	c
Ethyl acetate	a	b	c	c
Dichloromethane (methylene chloride)	a	b	c	c
Petroleum naptha	c	c	-	-
2- 300 ASE secondary organic constituents (i.e., degradation products)				
1,1-dichloroethylene (DCE)	a	b	c	c
trans-1,2-dichloroethylene (DCE)	a	b	c	c
1,1-dichloroethane (DCA)	a	a	c	c
1,2-dichloroethane (DCA)	a	b	c	c
Vinyl chloride	a	b	c	c
3- Inorganic constituents (related to fuel fabrication)				
Zirconium	a	d	b	d
Beryllium	a	d	b	d
Bromine	a	d	b	d
Uranium	d	d	d	d
Copper	a	d	b	d
4- Inorganic constituents (related to paint shop solvents)				
Barium	a	d	c	d
Cadmium	a	d	c	d
Lead	a	d	c	d
Silver	a	d	c	d

a Concentrations that exceed baseline (local background) threshold levels.

b Concentrations that exceed limits of quantitation (LOQ), i.e., the level above which quantitative results may be obtained with a specified degree of confidence, is defined by the American Chemical Society (1983) as  $10\sigma \pm 3\sigma$  at the 99 percent confidence level, where  $\sigma$  is the standard deviation of the instrumental background noise.

c Concentrations that exceed human health-based protection or safety levels (Appendix E-3); contingent on approval by Ecology.

d No action level. Concentration determined for information only.

1 E-1.2.2 Concrete Analytes  
2

3 Concrete samples will be analyzed for the same constituents as soil  
4 samples (Table E-1). The action levels for the 300 ASE solvent waste species  
5 in constituent categories (1) and (2) identified in Table E-1 are the primary  
6 concrete performance standards for two main reasons: only very small amounts  
7 of inorganic constituents, if any, would have accompanied spills or leaks from  
8 the 300 ASE and organic waste constituents are the only reliable indicators of  
9 contamination originating from the 300 ASE operations.

10  
11 Although inorganic constituents from fuel fabrication activities were  
12 present in the 300 ASE, they would not have been present in spilled solvent or  
13 water in significant quantities based on solubility considerations and  
14 concentrations of the raw waste solvent. The analysis of the raw waste as  
15 shown in Table 1-2 (Section 1.3.1) indicates that the concentrations for  
16 categories (3) and (4) of Table E-1 were largely undetectable (only zirconium  
17 was detectable at 2 ppm). Concentrations of any 300 ASE-derived inorganic  
18 contamination in a solid matrix such as soil or concrete would, therefore, be  
19 significantly smaller. Thus, detectable contamination of the soil or concrete  
20 with respect to inorganic constituents originating from the 300 ASE is highly  
21 unlikely given the type and extent of known and potential spills.

22  
23 Past practice operations on the 333 East concrete pad and elsewhere in the  
24 300-FF-2 Operable Unit are known to have involved fuels fabrication-related  
25 inorganic constituents. Both the 300 ASE and past practice activities  
26 involved the same types of inorganic constituents [i.e., fuel fabrication-  
27 related constituents of the type listed in categories (3) of Table E-1].  
28 However, the 333 East concrete pad is known to be contaminated with inorganic  
29 constituents from the past practice activities (Chapter 1.0, Section 1.1.2) in  
30 larger amounts than any which could have possibly come from the 300 ASE.  
31 Organic waste constituents, which constituted nearly 100 percent of the waste  
32 of concern, are therefore regarded as the only reliable indicators of 300 ASE  
33 derived contamination because: (1) it would not be possible to discriminate  
34 300 ASE-derived inorganic contamination from past practice derived  
35 contamination and (2) any detectable inorganic contamination or contamination  
36 patterns are undoubtedly attributable to past practice activities rather than  
37 to the 300 ASE. Thus, inorganic contamination associated with the 300 East  
38 concrete pad is most appropriately handled in conjunction with the  
39 300-FF-2 Operable Unit remedial actions. Ecology's final decisions regarding  
40 the closure of the 300 ASE, however, will be made on the basis of all data.

Table E-2. Solvent Evaporator Inductively Coupled Plasma-Atomic Emission Spectroscopy Analytical Results (1985).

	Detection limit <sup>a</sup>	NaOH/Zr <sup>b</sup>	KOH/Ni <sup>c</sup>	Average
	μg/mL	μg/mL	μg/mL	μg/mL
Aluminum	0.03	6	10	8
Antimony	0.05			
Arsenic	0.8			
Barium	0.002			
Boron	0.01	5	2	4
Cadmium	0.004			
Calcium	0.01	46	52	48
Cerium	0.04			
Chromium	0.02			
Cobalt	0.01			
Copper	0.004			
Dysprosium	0.004			
Europium	0.002			
Gadolinium	0.01			
Iron	0.005	6	78	30
Lanthanum	0.008			
Lead	0.06			
Lithium	0.004	4	2	3
Magnesium	0.06			
Manganese	0.002			
Molybdenum	0.01			
Neodymium	0.02			
Nickel	0.02			
Phosphorus	0.1	18	25	20
Potassium	0.3		ND	
Ruthenium	0.05			
Silicon	0.02	20	28	24
Sodium	0.01	ND	46	46
Strontium	0.002			
Tellurium	0.06			
Titanium	0.02			
Zinc	0.02			
Zirconium	0.008	ND	2	2

<sup>a</sup> ICP-AES analysis performed for the elements listed. No results shown for concentrations below detection limit.

<sup>b</sup> Sodium hydroxide fusion in a zirconium crucible was performed to solubilize the sample.

<sup>c</sup> Potassium hydroxide fusion in a nickel crucible was performed to solubilize the sample.

<sup>d</sup> ND = Not determined.

### E-1.3 CLEAN CLOSURE CRITERIA

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Data obtained from this investigation will be evaluated against the performance standards identified as action levels in Table E-1. The term 'action level' herein refers to concentration levels that sample analytes should not statistically exceed for clean closure of the facility. These concentration levels include baseline thresholds or other concentrations that are protective of human health and the environment (e.g., Table E-1). If the concentration level of any constituent identified in Table E-1 is significantly above the initial action level, continued efforts toward clean closure will be pursued only if further assessment of action levels is warranted. This measure is proposed because contaminant concentrations for soil and concrete which may exceed an action level, also may be significantly below any health or environmental-based risk level. Reevaluation of the action levels could, therefore, be considered in the event that one or more of the initial action levels are exceeded, and further assessment of the action level is warranted. Any additional evaluation would be based on 1) the type and extent to which an action level is exceeded, and 2) the further assessment of health-based risk using data from sources such as the EPA Integrated Risk Information System (IRIS) (EPA 1991), the Health Effects Assessment summary tables (EPA 1989b), and methods recommended by EPA (1989a), Ecology (1991), or other appropriate sources. The DOE-RL will request approval for the use of alternative action levels from Ecology for closure of the 300 ASE, where warranted. If dangerous constituents are determined to exist in concentrations above action levels and reevaluation of action levels is not warranted, an alternative plan of closure in conjunction with the Remedial Investigation/Feasibility Study of Operable Unit 300-FF-2 will be implemented.

### E-1.4 ACTION LEVELS AND BASELINE THRESHOLD CONCENTRATIONS

Initial action levels for both the inorganic and organic constituents listed in Table E-1 in soil samples will be the baseline threshold values obtained from the composition of baseline samples. The initial action levels for the organic constituents in concrete will be the analytical limits of quantitation (ACS 1983). Inorganic constituents in concrete and uranium in soil will be determined for information only (Appendix E-1.2.2). Alternative action levels will be considered where warranted. Ecology will review all data in the decision process. If clean closure conditions cannot be met, closure will be performed in conjunction with Operable Unit 300-FF-2 as identified in Chapter 3.0, Section 3-4 (Figure 3-1).

Alternative action levels will be health-based protection levels or other appropriate criteria. Assessment of the concentration levels that are protective of human health will be based on hazard identification, dose-response information, exposure models, and risk characterization (EPA 1991). The parameters used in assessing potential toxicity and increased cancer risk from the 300 ASE waste constituents are listed in Table E-3. Specific values will be calculated from these data with appropriate assumptions for exposure and acceptable risk. Calculation methods for these protection levels, as recommended by Ecology (1991) and EPA (1989b, 1991), will be generally similar and only differ in the parameters used in the exposure models, which include

land use. Examples of health-based action levels for soil are listed in Table E-3. In general, carcinogenicity criteria will be used to define the action levels for known and probable carcinogens (Class A and B carcinogens). Chronic toxicity no effect levels will be used as action levels for constituents that are potentially toxic. It is seen in Table E-3, however, that these protection levels for toxicity can vary by times for exposure type and by nearly 44 times as a function of land use. For carcinogenicity, land use considerations result in action levels that differ by over 132 times. The basic differences in the assumptions regarding exposure for the values calculated in Table E-3 are summarized at the bottom of the table. The validity and practicality of these assessments, therefore, depend on a careful assessment of how these values will be generated, and the use of realistic assumptions regarding exposure and risk for the case considered.

The evaluation of potential soil contamination derived from the 300 ASE operations will require a comparison between the compositions of the samples from the closure area to those of an appropriate reference or background soil site. Because the soil covering the 618-1 Burial Ground is also the soil material upon which 300 ASE wastes may have been spilled, and because it is probably unique to the 300 Area (i.e., from an unknown source); this soil cover is the only appropriate material (similar strata) that can be used for comparison with soil from the closure areas. Therefore, the soil cover for the 618-1 Burial Ground has been used to establish reference soil concentrations. Samples of the 618-1 Burial Ground soil, apart from the 300 ASE, will, in effect, serve as the local background. In order to avoid confusion, these local (area) background samples will be referred to as baseline samples because they are not natural background in the strict sense (i.e., unaffected samples that are part of the population of soil samples in the general area outside the 618-1 Burial Ground). Thus, this type of baseline represents a special case in the context of Ecology's definition of backgrounds (Ecology 1991).

Note that the term 'baseline' as used in this document refers to threshold concentrations rather than mean baseline concentrations. The technical basis for establishing baseline threshold concentrations and the new methods by which significant deviation from baseline is to be determined is addressed in Section E-10, Interpretations and Statistical Treatment of Data. The selection of the number of baseline soil samples has been based on professional judgment. Eight baseline soil samples will be collected. Written notification will be provided to Ecology in the event that Westinghouse Hanford and the DOE-RL recommend that this number be changed.

Table E-3. Performance Standards for Organic Constituents. (sheet 1 of 2)

Constituent	Constituent CASRN ID number	Chronic toxicity reference dose (RfD) (mg/kg/day)*	Cancer potency factor (mg/kg/day)*	Carcinogen class*	Health-based action level examples (mg/kg)††			Selection basis
					1	2	3	
Primary 300 ASE Constituents								
Perchloroethylene (PCE)	127-18-4		0.051*	B2**	20*	14 to 1,400*	2,574*	Carcinogenicity†
Perchloroethylene (PCE)	127-18-4	0.01			800	7,000	35,000	Toxicity
Trichloroethylene (TCE)	79-01-6	8 E <sup>III</sup>	0.011 <sup>b</sup>	B2**	64 <sup>b</sup>	560 <sup>b</sup>	2,800*	Toxicity
1,1,1-trichloroethane (TCA)	71-55-6	0.09		D	7,200	63,000	315,000	Toxicity
Ethyl acetate	141-78-6	0.9			72,000	630,000	no limit	Toxicity
Methyl ethyl ketone (MEK)	78-93-3	0.05		D	4,000	35,000	175,000	Toxicity
Dichloromethane (Methylene chloride)	75-09-2	0.06	0.0075	B2	133	1,164	17,500	Carcinogenicity
Naptha (petroleum)	8030-30-6				N/A	N/A	N/A	
Secondary 300 ASE constituents (i.e., daughter products)								
1,1-Dichloroethylene (DCE)	75-35-4	0.009	0.6	A	2		219	Carcinogenicity
trans-1,2-Dichloroethylene (DCE)	156-60-5	0.02			1,500	14,000	70,000	Toxicity
1,1-Dichloroethane (DCA)	75-34-3			C	N/A	N/A	N/A	
1,2-Dichloroethane (DCA)	107-06-2		0.091	B2	11		1,442	Carcinogenicity
Vinyl chloride	75-01-4		2.3 <sup>c</sup>	"	0.43		57	Carcinogenicity

\* Data from IRIS online data base (EPA 1991) as of 03-27-91.

† Information from the Health Effects Assessment Summary Tables (HEAST) (EPA 1989b).

†† Example (1): Based on Ecology's (1991) residential model for child exposure due to soil ingestion: Toxicity protection levels based on child exposure using the following parameters: 16 kg body weight, ingestion of 200 mg soil/day daily, 365 days per year for a lifetime (75 years), and 100 percent efficiency for metabolism of ingested soil. Carcinogenicity is based on the same parameters for an acceptable cancer risk factor of 1 in 1,000,000 (10<sup>-6</sup>), and a 6 year duration of exposure.

Table E-3. Performance Standards for Organic Constituents. (sheet 2 of 2)

Example (2): Based on an EPA (1989b) residential model for adult exposure due to soil ingestion. Toxicity protection levels based on adult exposure using the following parameters: 70 kg body weight, ingestion of 100 mg soil/day daily, 365 days per year for a lifetime (75 years) and 100 percent efficiency for metabolism of ingested soil. Carcinogenicity is based on the same parameters for cancer risk ranging from  $10^{-4}$  (for suspected carcinogens) to  $10^{-6}$  (for known carcinogens) averaged over a lifetime (75 years).

Example (3): Based on Ecology's (1991) industrial model for adult exposure due to soil ingestion: Toxicity protection levels based on adult exposure using the following parameters: 70 kg body weight, ingestion of 50 mg soil/day daily, on the average of 40 percent of each year over a lifetime (75 years), and 100 percent efficiency for metabolism of ingested soil. Carcinogenicity is based on the same parameters for an acceptable cancer risk factor of  $10^{-5}$ , and a 20 year duration of exposure.

Carcinogenicity data for lifetime exposures are not available at this time. This substance has been evaluated by the EPA for evidence of human carcinogenicity potential. This does not imply that this chemical is necessarily a carcinogen. The evaluation is under review by an inter-office agency work group. A risk assessment summary will be included on IRIS when the review has been completed (EPA 1991).

Reference dose for chronic oral exposure is under review by EPA (pending). Carcinogen assessment summary has been withdrawn following further review. A new carcinogen summary is in preparation by the CRAVE work group (EPA 1991).

Reported human data and animal studies for this substance have not demonstrated carcinogenicity (EPA 1991).

Class D carcinogen; not classifiable as to human carcinogenicity (EPA 1991).

This chemical has not been evaluated by EPA for evidence of human carcinogenic potential (EPA 1991).

This substance is not included in the IRIS (EPA 1991) or HEAST (EPA 1989b) references. The only hazard identified for petroleum naphtha is flammability at concentrations between 1-6 percent in air (Sax and Lewis 1987).

There is presently no reference dose for chronic oral exposure (RfD). A risk assessment group for this substance/agent is under review by an EPA work group. This substance is a Class C carcinogen (i.e., possible human carcinogen). This classification is based on no human data and limited evidence of carcinogenicity in two animal species (rats and mice). No quantitative estimate of carcinogenic risk from oral exposure (EPA 1991).

There is no information on this substance in IRIS (EPA 1991). The information listed here is from the Health Effects Assessment Summary Tables (EPA 1989b).

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Closure Plan  
300 ASE, Rev. 3A  
06/26/91

## E-2. CONTAMINATION SCENARIOS AND ASSESSMENTS

The 300 ASE soil and concrete sampling and analysis strategy has been based on the operational history, known spill events, and assessments of the known spill and possible barrel leak events. Contamination assessments are especially useful as a basis for development and justification of the soil and concrete sampling and analysis strategy. The primary objective of these assessments has been the determination of how much waste material from any 300 ASE facility discharge, particularly the volatile/semi-volatile constituents, would be expected to remain in the soil and concrete. Both soil and concrete worst case spill and leak scenarios were developed and analyzed to determine the time required for complete evaporation of the volatile constituents.

### E-2.1 ASSESSMENT METHODS

The contamination assessment process for the 300 ASE involved the following steps:

- Development of spill/leak scenarios
- Identification and summary of pertinent conditions and physical properties necessary as model input parameters (e.g., temperature, vapor pressures, discharge rates, etc.)
- Calculation of evaporation rates as a function of temperature, relative humidity, etc.
- Determination of the time required for evaporation of the total spill from the concrete surface (concrete models only); maximum surface evaporation time set equal to residence time on the concrete
- Determination of maximum penetration depth of water/solvent or solvent using calculated residence times and physical characteristics of the medium
- Determination of maximum time required for complete evaporation of water/solvent or solvent from a maximum thickness of affected concrete (concrete models only).

All models incorporated the use of information such as weather conditions, assumptions concerning discharge volumes and rates, and the physical properties of the media as input parameters into the calculations. The pertinent data and representative ranges of temperature dependent parameter values are tabulated in Table E-4. Standard calculation methods for evaporation processes (e.g., Welty et al. 1969, p. 487) were used. The relative rates of evaporation rates for Water, PCE, and TCA at various temperatures were calculated. The values for water are consistent with annual Hanford Site evaporation rates over the past 10 years (WHC 1990). Weather conditions over the spill period were obtained from Pacific Northwest Laboratory reports for the Hanford Meteorology Station. Values for the physical and chemical properties of water and the solvents were obtained from



Table E-4. Model Conditions and Assessment Results.

Model conditions	Reference values	Range	March 1985 average	Hanford Site average
Temperature (°C)	5	-5 to 17	5	12
Relative humidity (%)	55		55	53
Wind velocity (mph)	0		7	7.7
Evaporator spill volume (gal)	100			
Barrel leak volume (gal= 1 bbl)	55			
Evaporator spill rate (l/h)	10	0 to 5		
Barrel leak rate (l/h)	10			
Evaporative film thickness (mm)	1			
Minimum evaporative surface area for a spill (ft <sup>2</sup> )	200			
Minimum evaporative surface area for a barrel leak (ft <sup>2</sup> )	11			
Hydraulic conductivity for concrete (m/sec)	10 <sup>-9</sup>	10 <sup>-7</sup> to 10 <sup>-16</sup>		
Porosity for concrete (%)	5	3 to 30		
Physical properties:		Water	PCE	TCA
Molecular weight (g/mole)		18	165.83	313.66
Density (g/cc)		1.0	1.63	1.35
Vapor pressure (mm)		6.5	3	20
Calculated results concrete assessments*				
Evaporation rate (l/m <sup>2</sup> -hr) for reference values		0.26	0.68	10.7
Time required for spill/leak discharges (h)		40	21	21
Fluid penetration depth for spill/leak discharges (mm)		<9	<2	<2
Time for complete drying of the penetrated concrete (after discharge)		<7 days	<2 hours	<10 minutes
Total time required for complete evaporation (from the beginning of the spill/leak)		<12 days	<24 hours	<24 hours
* Calculated values for water are for the evaporator spill model, and values for PCE (perchloroethylene) and TCA (1,1,1 trichloroethane) are for the barrel-leak models.				

the *Handbook of Chemistry and Physics* (CRC Press 1987), and the *Handbook of Environmental Data on Organic Chemicals* (Verschuereen 1983). Other sources of information include data from the Portland Cement Association (PCA 1968) and Feenstra and Cherry (1988). All concrete assessments were based on porous media models, i.e., unfractured concrete. Model results for each of the assessments are tabulated in Table E-4.

Conservative values for temperature, wind speed, humidity, etc., were also used in the concrete assessments to bias results toward minimization of evaporation effects in order to obtain upper limits on the duration of solvent wastes on the pad. Fluid penetration depth and subsequent drying time calculations vary directly with the hydraulic conductivity and inversely with the porosity of the medium. Therefore, conservatively large hydraulic conductivity values and small porosity values were used in the assessments.

Hydraulic conductivity values for unsaturated porous media, such as concrete, are up to 10,000 times smaller than those for saturated media ( $10^{-7}$  to  $10^{-16}$  meters per second for limestone/concrete). Therefore, the value of  $10^{-9}$  meters per second was used as the conservatively large value for concrete models. Typical values of total porosity for concrete range to values as high as 30 percent, however, a porosity of 5 percent was used as the conservatively small value in the calculations. The reference parameter values and normal ranges for these values are listed in Table E-4. Thus, all calculated evaporation times would be faster, and calculated fluid penetration depths shallower, for parameter values that were not as strongly biased toward minimizing the evaporation effects. Therefore, it should be recognized that these assessments represent worst-case scenarios; because of this bias in fluid discharge volumes and rates, temperature, humidity, wind speed, wetted surface area, hydraulic conductivity and porosity of the media.

## E-2.2 CLOSURE AREA SOIL AND CONCRETE

The operational history (Section 1.1.2) and spill information (Section 1.4) have been previously described. Because this information provides the basis for development of spill scenarios and their assessment, information of events pertinent to the assessments are briefly summarized here.

Operation of the 300 ASE from 1975 to 1985 was confined to the portion of the original 333 East concrete storage pad and the 10 foot by 50 foot strip of soil adjacent to the pad on its southern edge, as shown in Figure E-3. The original pad is 4 inches thick and reinforced with number 10 wire mesh. The southern edge of the concrete and the adjacent soil (gravel) were sites on which the 300 ASE was located for solvent treatment. The soil consists of loose fill material approximately 4 feet thick that serves as a cover for the underlying 618-1 Burial Ground. The concrete area extending up to 20 feet north of the southern edge of the pad was used for the evaporator and storage of barrels containing solvent awaiting treatment in the evaporator. This portion of the concrete sloped to a drain as shown in Figure E-3, and was included in the closure area. These sites constitute the 300 ASE closure area shown in Figure E-3.

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APP E-15

Boundary and East Edge  
of Original Concrete Pad

Burial Ground  
Markers (Typical)

East Pad Extension  
and Over Pour  
In Spring 1985

Concrete Berm/Fence  
Poured over Original  
Concrete Sept. 1984

Original Pad  
Expansion Joints

Concrete Closure  
Area

Soil Closure  
Area

Last Location  
of 300 ASE  
"Spill Site"

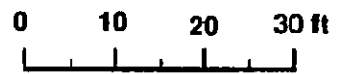
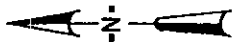
303-M Bldg.

Plugged  
4 In. Drain  
to Process Ponds

Direction of Original  
Drainage (Typical)

334-A  
Bldg.

334 Bldg.



Note: For drawing clarity over pours are shown separated  
when actually they are overlayed or touching

DOE/RL 88-08

Closure Plan  
300 ASE, Rev. 3  
03/30/90

78911137.1

Figure E-3. Closure Area for the 333 East Concrete Pad.

9413293.213

1 A new concrete pad, the 333 East 'overlay' pad, was poured over most of  
2 the west side of the 333 East Concrete Pad in September 1984. This new pad  
3 ranges in thickness from about 2.5 inches to 8 inches, and is reinforced with  
4 number 10 wire spaced at 6-inch intervals. The original 333 East Concrete Pad  
5 drain to the 300 Area process sewer, was also plugged at this time. The  
6 eastern side and extension to this composite pad was added during the Spring  
7 of 1985. The southwestern part of the original 333 East Concrete Pad is the  
8 only part of the concrete closure area that remains exposed (Figure E-3).

### 11 E-2.3 SPILL AND LEAK SCENARIOS

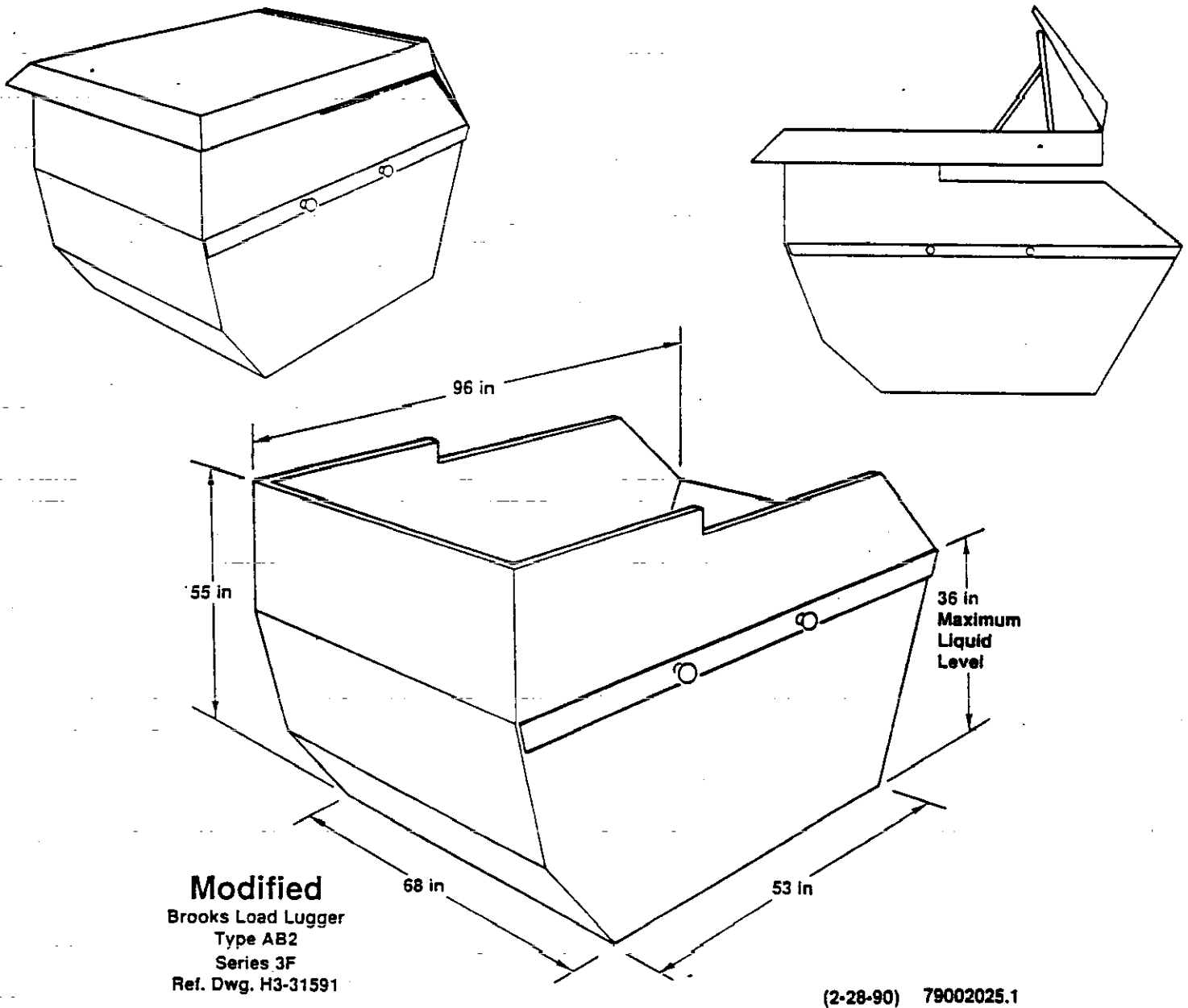
12 Contamination assessments have been made for the following spill and  
13 leak scenarios:

- 14 • Water/solvent discharge (possibly including paint shop constituents)  
15 resulting from a known evaporator overflow (spill) onto the soil
- 16 • Water/solvent discharge resulting from known evaporator overflow  
17 (spill) onto the exposed 333 East Concrete Pad adjacent to the soil at  
18 the known spill location
- 19 • The 1,1,1-trichloroethane leakage from barrels stored on the 333 East  
20 Concrete Pad
- 21 • The perchloroethylene leakage from barrels stored on the 333 East  
22 Concrete Pad.

### 30 E-2.4 EVAPORATOR OVERFLOW SPILL SCENARIOS

31 The only known spill associated with the 300 ASE operations occurred  
32 between March 1 and March 14, 1985, at the last location of the evaporator at  
33 the westernmost part of the soil closure area (see Figure E-2). The spill  
34 consisted primarily of water (steam condensate) based on the specific gravity  
35 and solubilities of the solvents present in the evaporator. The spill water  
36 has been estimated to have contained 0.05 percent 1,1,1-trichloroethane and  
37 0.01 percent perchloroethylene based on solubilities. The spillage is  
38 presumed to have occurred from the north-facing cutout side of the evaporator  
39 which overhung the southern edge of the 333 East Concrete Pad (Figure E-4).  
40 It is likely that most or all of the spillage was discharged onto the soil  
41 because of the slow-leakage rate (significantly less than 5 liters per hour  
42 (i.e., about 1.3 gallons per hour), and the tendency for the water to overflow  
43 as a sheet on the outer edge of the evaporator. Because it is not certain  
44 whether any of the spillage was actually discharged onto the original 333 East  
45 concrete pad, models have been evaluated using highly liberal values for the  
46 discharge volume and rate of 400 liters and 10 liters per hour (approximately  
47 106 gallons and 10.6 quarts per hour, respectively).

48 Weather conditions over this period recorded at the Hanford Meteorology  
49 Station are as follows: temperatures range 63°F to 23°F (17°C to -5°C) with an  
50 average of 41°F (5°C); average wind speed, 7 miles per hour; average  
51  
52



1 Figure E-4. Schematic of the Evaporator.

(79002025.1)

1 relative humidity, 54 percent; 0.1 inches total precipitation. The  
2 evaporation rate for water was used as a conservative reference model because  
3 the water has the slowest evaporation rate, and would persist the longest in  
4 either the soil or the concrete.

#### 7 E-2.4.1 Assessment of Discharges to Soil

9 It is indicated from an assessment of the spill onto the soil that  
10 due to the loose permeable nature of the 4-foot soil layer overlying the  
11 618-1 Burial Ground, that most of the water/solvent would have passed through  
12 the soil and into the underlying burial ground. The upper 3 to 6 feet of soil  
13 (throughout the Hanford Site) is devoid of any water and volatile constituents  
14 during mid-summer months due to the complete drying of the soil percolation  
15 zone. It is indicated from soil moisture profiles (Last et al. 1976; Jones  
16 1978) that soil moisture less than 12 to 20 feet deep normally evaporates, and  
17 that this zone becomes devoid of moisture (and any other liquids with vapor  
18 pressures similar to or greater than water) during the summer months. Any  
19 periodic spillage of water/solvent onto the soil would, therefore, be expected  
20 to completely evaporate and no longer be present if permitted to dry over a  
21 period including the summer months.

23 Inorganic metals dissolved in the spillage would tend to remain in the  
24 upper soil column due to the ability of the soil to absorb these constituents.  
25 Because the concentrations of dissolved inorganic constituents of interest in  
26 the raw solvent (Table E-2) were at or near detection limits, the amount of  
27 dissolved inorganic material present in the spill water would have been 2,000  
28 to 10,000 times smaller than that in the raw solvent and, therefore,  
29 negligible. Any contribution of these inorganic constituents to the soil due  
30 to sorption or other concentration processes should have also been negligible  
31 due to the large spill volume required to sufficiently concentrate inorganic  
32 constituent to levels above detection and/or the soil baseline.

34 The only inorganic materials that could have been added to the soil in  
35 larger quantities were those associated with the low density and/or dissolved  
36 paint shop solvents. However, it is not known whether the paint shop solvents  
37 contained inorganic materials, or whether any paint shop solvents were present  
38 in the evaporator at the time of the spill. Because of this uncertainty,  
39 there is a possibility of some inorganic soil contamination from this source.

#### 42 E-2.4.2 Assessment of Discharge to Concrete

44 Although it is likely that little, if any, water/solvent from the  
45 evaporator was spilled onto the 333 East Concrete Pad, worst-case models were  
46 evaluated for the discharge of a 400 liter reference volume onto the pad at a  
47 rate of 10 liters per hour. Any spillage onto concrete would have been  
48 confined to the portion of the original concrete pad, i.e., the exposed 40 foot  
49 by 10 foot southwest corner of the pad, due to the effect of the overlay pad  
50 to prevent drainage toward the plugged 300 Area Process Sewer. Due to the  
51 presence of the overlay pad, any significant spill onto this portion of the  
52 pad would have resulted in ponding of the spill. A conservative estimate of  
53 the time required for evaporation of the water/solvent from the pad surface

was based on evaporation of the entire 400-liter volume spread over an area of approximately one half of the 400 square foot exposed concrete area (i.e., 200 square feet). The minimum residence time of water/solvent on the concrete was taken to be the time required for the spill to occur (i.e., 40 hours) plus the calculated time required for evaporation of the 400 liters from the concrete surface (assuming no evaporation during the 40 hour spill time).

The assessment of the water/solvent overflow from the evaporator onto the 333 East Concrete Pad yielded the following result for the conditions described above and the reference values listed in Table E-4.

- The total spill volume of 400-liters of water/solvent would have completely evaporated from the surface of the concrete in less than 5 days. Complete drying of the concrete would have required less than 7 days for a fluid penetration depth of 3/8 inches (at 5°C). The concrete would have been devoid of spill constituents in less than 12 days after initiation of the spill.
- Water/solvent from the spill would have penetrated the concrete to maximum depth of less than 9 millimeters (3/8 inch).
- The choice of different (i.e., larger) spill volumes, discharge rates, or other parameters, would not alter the conclusion that the water/solvent would have evaporated from the exposed 333 East Concrete Pad in less than 2 weeks after discharge.

## E-2.5 ASSESSMENTS OF BARREL LEAKS TO CONCRETE

Assessments of the discharge of solvent-only barrel leakage onto the 333 East Concrete Pad involved the determination of the maximum duration of solvent wastes on the pad and their removal due to evaporation. Evaporation models for perchloroethylene and 1,1,1-trichloroethane discharges were used to assess possible leakages from the barrels of spent solvent stored within 20 feet of the southern edge of the pad (i.e., a minimum of 55 feet from the 300 Area Process Sewer drain).

The barrel leak scenarios differ from the overflow spill scenario in that any leakage would have occurred prior to construction of the overlay pad and plugging of the 300 Area process sewer drain. Although barrel leakage rates would be expected to be smaller than the evaporator spill rate, the same discharge rate (10 liters per hour) were used as a worst-case condition. Residence time was assumed to be the time required for discharge of a 55-gallon drum (approximately 21 hours) plus the calculated time required for evaporation of solvent remaining on the pad at the end of this time. All assessments are calculated on a per barrel basis and assume porous media behavior of the concrete. It was also assumed in this model that any solvent not evaporated from the pad surface or penetrating the pad would have drained into the 300 Area process sewer system.

Average annual weather conditions at the Hanford Site pertinent to these assessments are as follows: temperature, 53°F, 54 percent humidity, and a 7.7 miles per hour wind speed (PNL 1983). However, it is not known whether

leakage from the storage barrels ever occurred, or when a leak may have occurred. Therefore, the weather conditions used for calculation of evaporation rates in the evaporator spill assessments are considered to be conservative, and were also used for the leak assessments (Table E-3). Leak models were also based on 1 meter (3 foot) wide wetted areas extending toward the drain. Assessments of perchloroethylene and 1,1,1-trichloroethane leaks from solvent storage barrels yield the following results for the conditions described in Table E-4:

- The leak rate dominates the residence time of solvent on the concrete surface for both perchloroethylene and 1,1,1-trichloroethane; i.e., 21 hours for a leak from a 55-gallon barrel at 10 liters per hour, plus less than 1 hour for evaporation of residual perchloroethylene or 1,1,1-trichloroethane; maximum residence time of less than 24 hours.
- Both perchloroethylene and 1,1,1-trichloroethane would have penetrated to a maximum depth of less than 2 millimeters.
- The PCE would have evaporated from a wetted thickness of 2 millimeters in less than 2 hours after the discharge ceased; 1,1,1-trichloroethane would have evaporated about ten times faster.
- Only the concrete in the immediate vicinity (1 to 2 meters downslope) of a leaky barrel is likely to have been impacted by solvent wetting and evaporation.
- It is likely that leaks of perchloroethylene and/or 1,1,1-trichloroethane would not have reached the 300 Area Process Sewer drain prior to complete evaporation.

#### E-2.6 ASSESSMENT SUMMARY

It is concluded from the results of these assessments that any spillage of water/solvent onto the soil or 333 East Concrete Pad, or leakage of perchloroethylene or 1,1,1-trichloroethane onto the pad would have completely evaporated and no longer be present.

Therefore, it is expected that after a period of several weeks following discharge, the solvent from the 300 ASE overflow spill should not have been detected in either the soil or the exposed or covered part of the original 333 East Concrete Pad. Inorganic constituents associated with the primary solvents should not have been detected in the soil. However, inorganic constituents from paint shop solvents that may have been in the evaporator at the time of the spill, could have been discharged to the soil and could be present in the upper levels of the soil.

Any perchloroethylene and/or 1,1,1-trichloroethane leakage from barrels stored on the original 333 East Concrete Pad would have completely evaporated from the concrete within a few hours to days of discharge. Therefore, it is concluded that any leakage onto the concrete pad from barrels associated with the 300 ASE would have evaporated long before the overlay pad was constructed



1 and would no longer be present in the exposed or covered part of the original  
2 333 East Concrete Pad.

### 5 E-3 SOIL SAMPLING

7 A total of 15 soil samples will be collected for the 300 ASE and  
8 submitted for analysis. Figure E-5 shows the soil closure area sampling  
9 sites. Following is a summary of the soil sampling effort.

- 11 • Six soil samples from the soil closure area.
- 12 • One duplicate soil sample.
- 13 • Eight baseline soil samples.

15 All of the soil samples will be taken from the material that was used to  
16 construct the 618-1 Burial Ground cover. The physical appearance of the  
17 618-1 Burial Ground surface soil indicates that the surface has been subjected  
18 to many uses. Color differences and undulations within the soil's surface are  
19 examples of prior utilization that has rendered parts of the 618-1 Burial  
20 Ground cover unsuitable for baseline sampling. These locations are identified  
21 as disturbed surface areas in Figure E-6. The soil sampling depth, sample  
22 locations, and discretion for field changes should minimize these factors.  
23 Sample locations and depths are described in the following sections. All soil  
24 samples will be collected in accordance with EII 5.2 and analyzed in  
25 accordance with standard SW-846 procedures (EPA 1986). Field and laboratory  
26 QA/QC requirements, specific methods and protocols are identified in the  
27 300 ASE quality assurance project plan.

#### 30 E-3.1 SOIL SAMPLING LOCATIONS

32 Six verification soil samples will be taken in the 300 ASE closure area.  
33 The soil closure area has been delineated by the locations of the evaporator  
34 during its operation. Throughout its use, the evaporator was confined to the  
35 southern edge of the 333 East Concrete Pad and the immediately adjacent  
36 50 feet by 10-foot strip of soil (see Figure E-3). The strategy of soil  
37 sampling within this 50 feet by 10 feet area is based on the following.

- 39 • The evaporator was located on the 10 by 10 feet block of soil  
40 designated as Block A in Figure E-5 at the time of the known spill  
41 (March 1985).
- 43 • The possibility exists for other unknown leaks or spills to have  
44 occurred on the soil closure area.
- 46 • The overflow from the evaporator would likely have spilled from the  
47 north-facing (cut-out) side as shown in Figure E-4.

9413293.2119

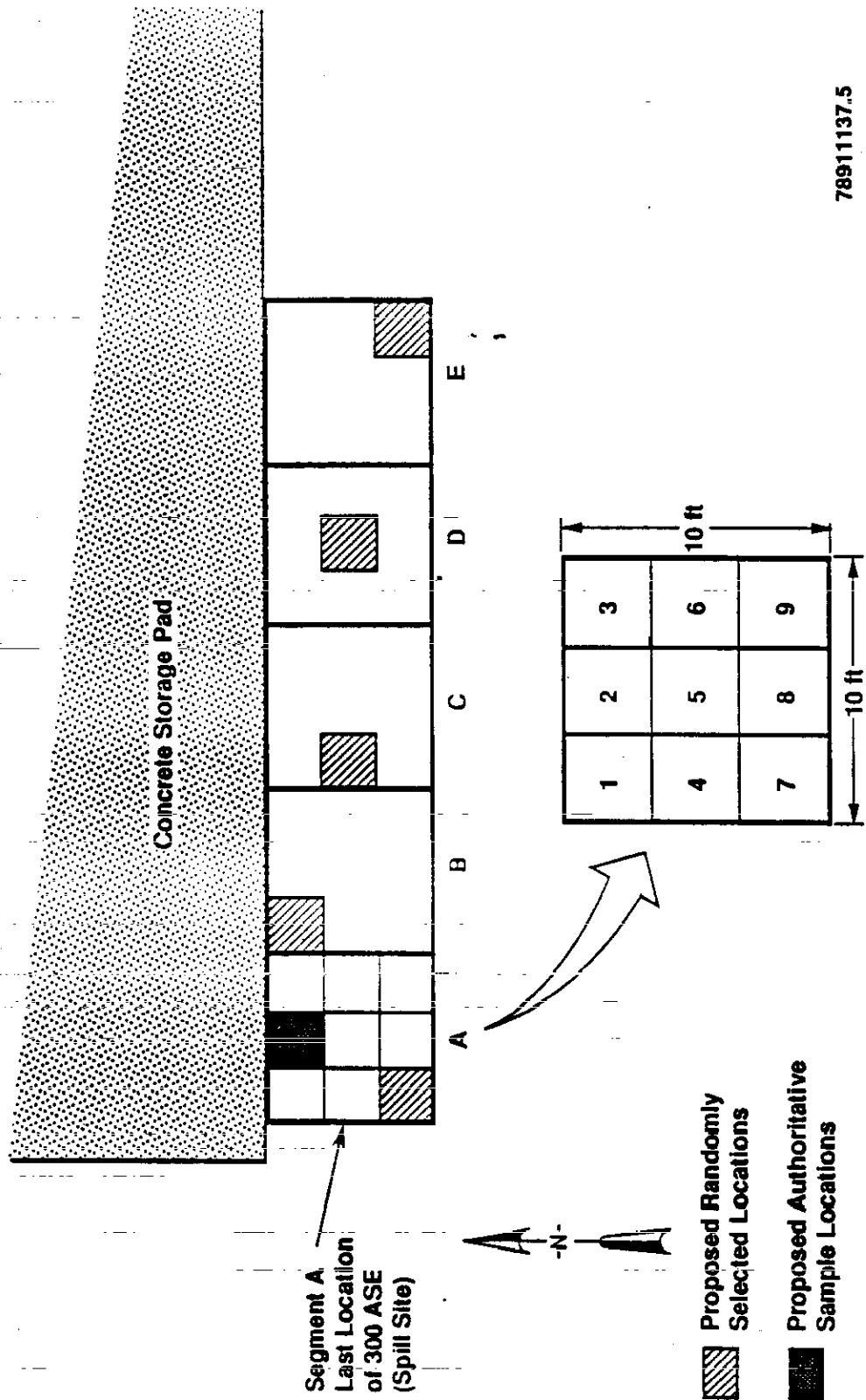
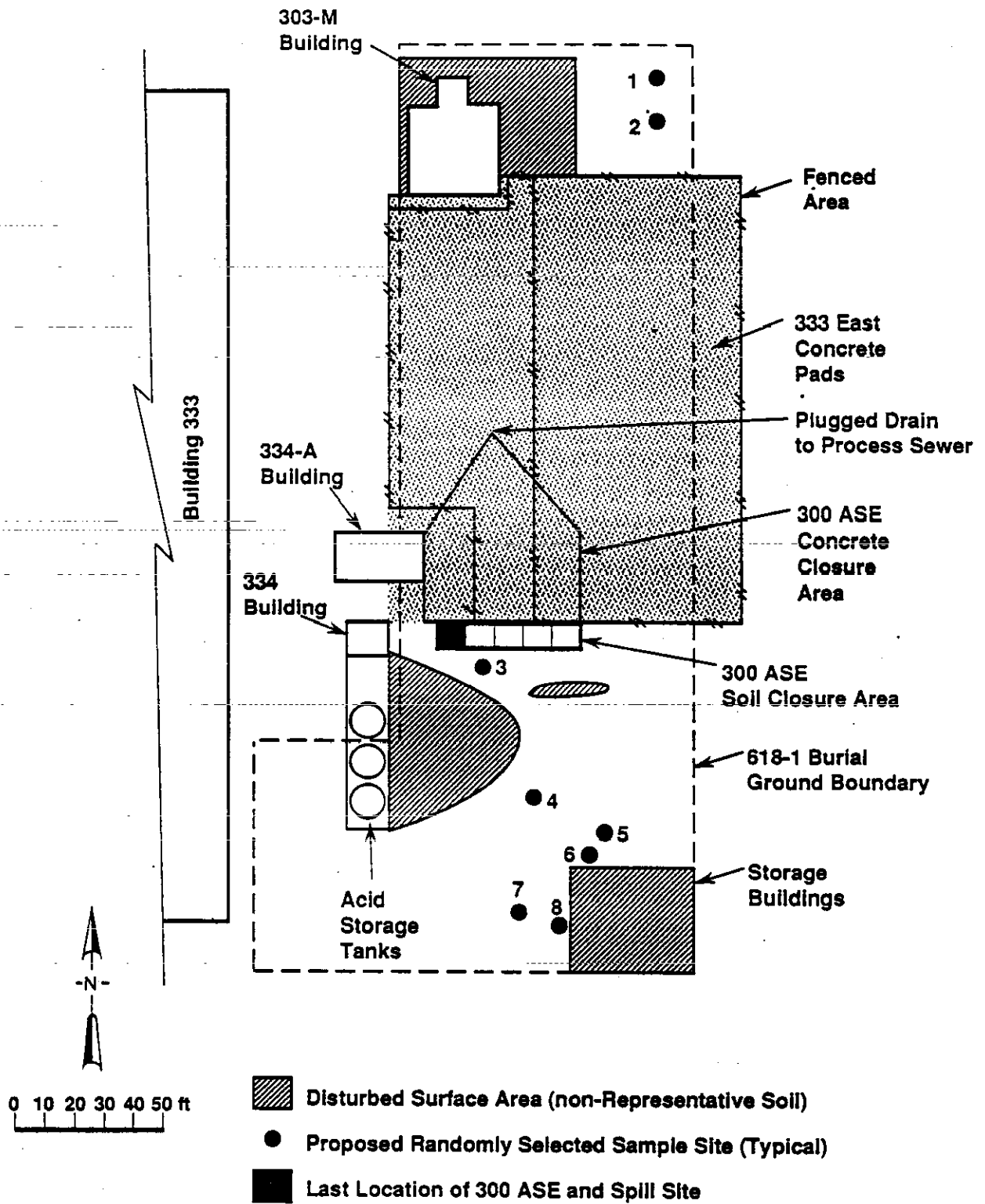


Figure E-5. Soil Closure Area and Sampling Sites.



39209058.1

Figure E-6. Baseline Soil Sampling Sites. (78911137.3)

1 The 10 by 50 feet soil closure area (Figure E-5) was divided into five  
2 blocks: Block A, B, C, D, and E. Each block was subdivided into nine equal  
3 parts (3.33 feet on a side). A sample location (grid block) was randomly  
4 chosen using a random number table (Cochran and Cox 1957) for each of the five  
5 blocks; i.e., five representative samples from the 45 possible locations.  
6 Additionally, an authoritative sample from Block A was also selected from the  
7 site of the steam condensate overflow. One of the samples will be field split  
8 to make a duplicate sample.

9  
10 Utilization of a simple random sampling scheme for these samples ensures  
11 that the data obtained will be representative of the population from which the  
12 samples were taken and will meet or exceed the minimum requirements of  
13 EPA SW-846 guidelines. Following soil sampling, the sampling locations will  
14 be hand graded to blend with the surrounding topography and will not become  
15 preferential pathways for precipitation infiltration.

### 16 17 18 E-3.2 SOIL SAMPLING DEPTH

19  
20 The baseline and closure area soil samples will be restricted to the  
21 upper 12 inches of the 618-1 Burial Ground soil cover. This soil cover is  
22 nominally 4 feet thick. Based on factors such as compaction over time and the  
23 potentially undulating upper surface of the 618-1 Burial Ground, it must be  
24 assumed that the actual thickness of the soil cover could vary from 4 feet to  
25 less than 2 feet in any given location. The sampling strategy is to collect  
26 shallow soil samples to avoid penetration of the 618-1 Burial Ground for  
27 health and safety reasons, but deep enough to preclude surface contaminations.  
28 Given these conditions, only the upper 6- to 12-inch zone of the soil can be  
29 safely sampled. The entire sample from each sample location will be submitted  
30 to the laboratory for analysis.

31  
32 Soil samples from the sampling zone of the closure area are expected to  
33 be suitable for evaluating contamination of the soil resulting from the  
34 300 ASE operation for the following reasons:

- 35  
36 • Inorganic metals and radionuclides would remain in the upper 12 inches  
37 of the soil based on the demonstrated ability of the soil to absorb  
38 these constituents (e.g., Routson et al. 1979)
- 39  
40 • Soil moisture profiles (Last et al. 1976; Jones 1978) indicate that  
41 soil moisture less than 12 to 20 feet deep normally evaporates and the  
42 zone becomes devoid of moisture (and any other liquids with vapor  
43 pressures greater than water) during the summer months. Thus, the  
44 upper 12 inches of soil would be appropriate to verify the absence of  
45 volatile organic solvents from the upper 4 feet of the soil above the  
46 618-1 Burial Ground.

### 47 48 49 E-3.3 SOIL BASELINE SAMPLING LOCATIONS

50  
51 Eight randomly selected locations within the 618-1 Burial Ground  
52 boundary have been selected for baseline sampling (Figure E-6). The selection  
53 of the number of baseline samples was based on professional judgment

(Section E-10). The eight sampling sites were chosen from a total of 45 randomly selected grid intersections from a 10-foot grid matrix within the 618-1 Burial Ground area (exclusive of the datum reference point). The eight locations shown in Figure E-6, were screened from among the 45 possible locations based on the following parameters:

- Sample locations will be at least 10 feet away from the 334 Building (acid storage tanks), other buildings, or known surface disturbance areas
- No samples will be taken closer than 10 feet to the edge of the 618-1 Burial Ground boundary or closure area
- Sample locations will be at least 10 feet apart.

Soil at the sampling sites will be hand graded to surrounding levels following sampling to minimize the generation of artificially induced fluid pathways resulting from sampling activities.

#### E-3.4 SOIL BLANKS AND SUMMARY TABLE

Note: This table reflects the minimum number of samples and blanks consistent with the quality assurance requirements. Additional duplicates and blanks may be taken at the discretion of the team leader to respond to field conditions. Section E-8 discusses duplicates and blanks.

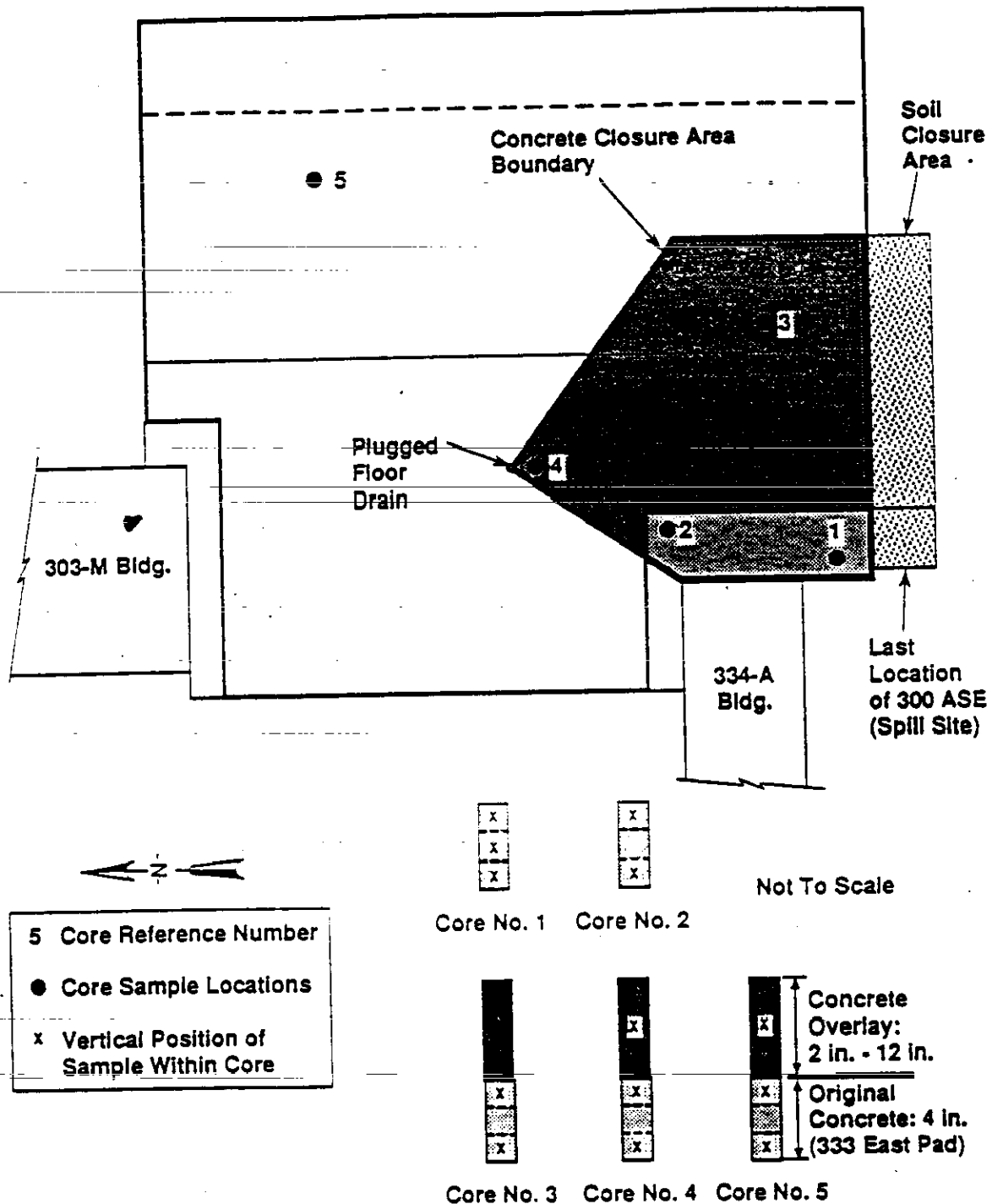
Summary Table - Number of Soil Samples and Blanks.

	Soil	Duplicate	Trip	Blanks		
				Field	Equipment	Total
Soil Baseline	8	0	0	0	0	8
Soil Closure Area	6	1	1	1	1	10
Total	14	1	1	1	1	18

#### E-4 CONCRETE CORE SAMPLES AND LOCATIONS

The concrete core sampling locations and sampling locations within each core are illustrated in Figure E-7. The following is a summary of the concrete sampling effort:

- Five concrete core sites
- A total of 14 concrete samples will be submitted for analysis; 13 samples from five cores and one duplicate



1 Figure E-7. Concrete Closure Area, Sampling Sites, and Sample Locations.

- Five samples from core sites 1 and 2 on the exposed 333 East Concrete Pad
  - three samples from core 1, which will be located on a fracture and penetrates the entire thickness of the pad
  - two samples from core 2, from the top half and the bottom half
- Six samples (two each from core sites 3, 4, and 5) that penetrate to the underlying (original) 333 East Concrete Pad.
- Two samples from the middle of the 333 East overlay pad from cores 4 and 5
- One sample from core 1 or 2 samples will be field split to make a duplicate sample.

Summary Table - Number of Concrete Samples and Blanks for the  
300 Area Solvent Evaporator.

	<u>Concrete</u>	<u>Duplicate</u>	<u>Trip</u>	<u>Blanks</u>		<u>Total</u>
				<u>Field</u>	<u>Equipment</u>	
333 Concrete Pads			1	1	1	
Original pad	11	1				
Overlay pad	2	0				
Total	13	1	1	1	1	17

Note: This table reflects the minimum number of samples and blanks consistent with the quality assurance requirements. Additional samples and blanks may be taken at the discretion of the team leader to respond to field conditions. Section E-8 discusses duplicates and blanks.

#### E-4.1 CONCRETE CORE SAMPLES

At least 2 inches of concrete core from the 333 East Concrete Pad will be taken at each of the five sites shown in Figure E-7. The cores will be approximately 1.3 inches in diameter. Cores from the 333 East overlay pad will require penetration of up to 8 inches to reach the underlying 333 East Concrete Pad. Air-misting drilling methods can be used to minimize heating of the core and also prevent excessive flushing of the cores with cooling water. The drilling method used to penetrate the boundary between the 300 East overlay pad and the original pad must not compromise future pad use and must also not produce airborne radioactive material (i.e., uranium dust). Concrete cores 4 and 5 from the 333 East overlay pad, unaffected by 300 ASE activities, will be analyzed for information only as requested by Ecology (two samples).

## E-4.2 CONCRETE CORE SITES

A total of five cores will be collected at the sites as shown in Figure E-7. The five cores will yield 14 samples (including the duplicate) for analyses. Following collection of the concrete cores, the holes will be immediately backfilled and sealed with field-mixed concrete to restore the pads for other usages and to preclude precipitation infiltration and/or contaminant migration.

### E-4.2.1 Exposed 333 East Concrete Pad Locations

Two cores (cores 1 and 2) will be collected from the southwest part of the exposed 333 East Concrete Pad for verifying the absence of volatile constituents in the concrete arising from the overflow from the 300 ASE, or a leak from the evaporator or solvent barrels. Core 1 will be collected from the exposed 333 East Concrete Pad and will be located on a fracture about 8 to 10 feet from the south edge of the pad. This location was selected because the fracture would have provided a pathway through the concrete, if it existed at the time of the spill; and also because of its proximity to the spill site. This core will penetrate the entire 4 inch thickness of the pad and will yield three samples for analysis. Core 2 will be collected from the northeast corner of the exposed pad where it adjoins the 333 East overlay pad (core 1). This location was selected because it is in line with the preexisting drain and is, therefore, the lowest point on the down gradient part of the exposed pad. Any ponding of fluid would be expected to occur at this location. This core will be approximately 4 inches long and should yield two 1-inch long samples for analysis (one from the top half and one from the bottom half).

### E-4.2.2 The 333 East Overlay Pad Locations

Three cores (cores 3, 4, and 5) will be collected through the 333 East overlay pad overlying the 333 East Concrete Pad for the purpose of verifying the absence of 300 ASE solvents that may have leaked from barrels onto the original 333 East Concrete Pad. Each of the cores will penetrate approximately 6 to 8 inches of concrete and must penetrate at least 2 inches into the underlying 333 East Concrete Pad. Core site 3 (two samples) has been selected because it is at a position in the southeastern portion of the pad approximately at a known temporary storage site of solvent barrels (see Figure 1-7 of the *300 Area Solvent Evaporator Closure Plan*, Revision 3.)

The remaining two core sites (cores 4 and 5) have been selected by Ecology. Core site 4 (three samples) has been located about 1 foot south of the plugged drain (Figure E-7) to verify that any solvents originating from solvent barrel leaks on the original 333 East Concrete Pad have not reached the drain. Core site 5 has been located outside of the closure area away from 300 ASE affected activities, as indicated in Figure E-7. This site will yield three samples: one from the middle of the overlay pad and two from the original 333 East Concrete Pad. The analysis of the samples from core site 5 will be for informational purposes only, as directed by Ecology.



### E-4.3 CONCRETE ANALYSIS

There are currently no EPA protocols for the collection and processing of concrete core samples or the identification of volatile contamination of concrete. The analytical methods used for inorganic analysis of soils can be used for the analysis of inorganics in concrete samples; however, the sample preparation and analysis methods for volatile and semi-volatile waste constituents in soils cannot be applied to concrete because sample preparation involving crushing or powdering could severely compromise the integrity of concrete samples and thus render them useless for regulatory compliance purposes (Urban et al. 1989). This is a critical concern for verifying the absence of volatile waste constituents for RCRA clean closure requirements. The EPA (Office of Solid Waste) and authors of the EPA SW-846 protocols concur that approved methods for the analysis of solid waste and soils for volatile constituents are not suitable for concrete samples. It is indicated from a survey of laboratory techniques for the analysis of volatile constituents in concrete, that most of these techniques are not technically defensible. Existing methods are inadequate for several reasons:

- Concrete samples cannot be pulverized or finely crushed for gas chromatography analysis without extensive loss of volatile constituents from pore spaces
- Headspace and purge and trap techniques utilized for soils are inadequate for solid concrete owing to significant differences in the nature of the media, i.e., the pore spaces from solid concrete are not effectively purged as they are for soil
- Most fluid extraction (methanol or water) techniques are inadequate because constituents in the pore volume of the concrete cannot efficiently exchange with the extraction fluid, or because the efficiency of the extraction method is unknown.

The concern of volatile loss is also paramount in the sampling of concrete which potentially contains volatile waste constituents. Sampling of concrete is typically performed by coring. There are no specific guidelines regarding the coring techniques and coolant requirements, other than those concerning airborne radioactive materials. Concrete potentially contaminated with volatile waste constituents, however, requires special sampling considerations that preserve the integrity of the sample. Thus, practical and technically sound sampling and analysis methods for concrete must be calibrated or developed for RCRA activities involving concrete potentially contaminated by volatile constituents.

### E-4.4 INTERIM MEASURES

Methods for practical and technically sound sampling and analysis of concrete containing volatile waste constituents are being investigated. Plans for feasibility and calibration testing of concrete testing methods are in preparation. The use of organic coolants will be avoided in any core sampling efforts. Based on expert opinion (e.g., Portland Cement Association) and calculations on the impact of coring cooling water on concrete core, it is

indicated that air-misting while coring may be the most practical method of core sampling. Other possible methods include vacuum and heat extraction methods for pore gases from concrete cores and modified fluid extraction techniques. Decisions regarding the practicality and feasibility of the core-cooling methods will require proof-of-principal and calibration testing. These activities are planned to begin in 1991, and should be completed prior to the beginning of concrete sampling at the closure site. Preliminary findings and developments regarding this concrete sampling and analysis issue will be reported to Ecology at Unit Managers meetings or more frequently when necessary.

Verification of the absence of volatile constituents that may be near detection limit concentrations requires care in the taking and preparation of the sampling for analysis. Most sample preparation methods involving crushing of the sample for gas chromatography analysis are unacceptable because crushing the sample too finely causes the release of the volatile constituents from accessible pore spaces in the sample prior to analysis. The alternative method of analysis involves laboratory crushing of the concrete to obtain a size fraction about 1/8 inch in diameter that will be immediately loaded into the stainless steel sample port of a thermal desorption mass spectrometer, and analyzed for organic constituents. This method is preferred because crushing to the 1/8 inch size fraction does not severely impact volatile loss due to the relatively large amount of unaffected pore space that remains. Alternative sample handling and analysis methods are also under consideration. Analysis of concrete samples for volatile organic analyses must precede analysis for inorganic constituents. Concrete samples could then be processed (e.g., crushed) and analyzed for inorganic constituents according to EPA guidelines in the same manner as soil samples.

#### E-5 FIELD MODIFICATIONS TO THE SAMPLING PLAN

Under field conditions the optimal aspects of preliminary sample design are sometimes not achievable. Factors influencing the sampling efforts can be equipment malfunction or breakdown, improper equipment, physical barriers to coring equipment, weather conditions, soil conditions, and overly optimistic evaluation of capabilities at sites with no previous history of dangerous waste characterization. Because of unforeseen field conditions, decisions concerning modifications to the planned activity may be necessary. When conditions are encountered that require modifications in the field, the following steps as documented in *Environmental Investigation and Site Characterization Manual*, WHC-CM-7-7, EII 1.5, "Field Logbooks", and EII 5.2, "Soil and Sediment Sampling" (WHC 1989) will be observed and require post-approval of the project technical leader and/or the cognizant environmental quality assurance and quality control authority.

The field team leader will perform the following:

- Document any modifications required
- Record this information in the field logbook, including the modifications made and a justification for the change

- Obtain the project leader's approval and field logbook signature (Section E-6.3) following completion of the day's field work for instances where major deviations from the sampling plan occur.

Adherence to the normal sampling procedures will provide an accurate record of modifications and allow sampling to proceed safely, while maintaining efficient equipment and manpower usage.

## E-6 SAMPLING EQUIPMENT AND PROCEDURES

The following sections outline the field sampling equipment and procedures that will be used during the soil and concrete sampling operations.

Samples collected for organic analysis will not be crushed or stirred in the field for homogenization purposes in order to avoid volatile loss and invalidation of the samples. Care will also be exercised to minimize disaggregation for the same reasons.

### E-6.1 SOIL SAMPLERS

Samplers to be used will consist of appropriate tools to meet the broad spectrum of soil sampling needs that may be encountered. These samplers should generally be constructed of stainless steel or have liners constructed of inert materials. The following are examples of the types of samplers that may be used:

- Thief
- Trier
- Auger
- Split spoon
- Trowel
- Scoop
- Shovel.

The proposed method for soil sampling is to use a stainless steel hand-auger for boring to a depth of 12 inches.

Any additional equipment and supplies needed to perform the necessary soil sampling will be procured in accordance with WHC-CM-7-7, EII 5.2, "Soil and Sediment Sampling".

### E-6.2 CONCRETE CORING AND SUPPLEMENTAL EQUIPMENT AND SUPPLIES

This section lists the possible types of equipment required to core drill into or through the 300 ASE concrete pad for the purpose of obtaining samples for site characterization.

- Electric generator set
- Core drill equipment

- Vacuum base drill mount
- Vacuum pump
- Hoses
- HILTI\* concrete bolting equipment
- Compressed breathing air
- Non-shrink grout material
- Steam cleaning equipment
- ASTM Type IV reagent grade water.

Additional equipment and supplies will be procured as required to perform the necessary concrete sampling.

Procedures for concrete sampling are being prepared for inclusion into the *Environmental Investigation and Site Characterization Manual (EII)*.

### E-6.3 FIELD LOGBOOKS

A vital part of any sampling and analysis plan requires the assurance that all the information and data associated with each sample are accurate and verifiable.

The personnel conducting sampling will maintain an official log book during the effort. The logbook will be bound and have consecutively numbered pages. All information pertinent to the sampling must be recorded in the logbook in a legible fashion. Changes shall be avoided but, when necessary, will be indicated by a single line drawn through the affected text. The individual responsible for the change will initial and date the entry. Daily activities or separate sampling episodes must be dated and signed. The logbook should be protected, stored in a safe file or other repository, and maintained as a permanent record.

The following information is documented in WHC-CM-7-7, EII 1.5, "Field Logbooks":

- Project/task name
- Site map, sketch, drawing, or other definitive site description
- Locations of all sampling points, including reference permits and scale
- Sample method
- Date and time of collection
- Daily identification of participants and their responsibilities
- Number, type, volume of samples taken

---

\* HILTI is a trademark of HILTI Fastening Systems.

- Identification number for each sample
- Field observations (weather conditions, temperature, wind, wetness and appearance of sample, etc.)
- Laboratory of destination
- Field measurements, if any
- Signature of recording personnel.

As warranted, additional items that may be included are:

- Name and address of field contact
- Producer of waste
- Type of process
- Type of waste
- Type/purpose of sampling
- Suspected waste concentrations
- Sample distribution and transportation method
- Photographs of site for field conditions and site location verification
- Other information deemed pertinent.

#### E-6.4 GENERAL SAMPLE COLLECTION

This section chronologically lists the steps for collecting samples.

##### E-6.4.1 Sample Containers and Preservation

Containers for potentially dangerous waste samples will be chosen based on their compatibility with the waste, resistance to leakage or breakage, ability to seal tightly, and required volume for an optimum sample. Containers for collecting and sorting dangerous waste samples will be made of high-density plastic or glass appropriate for the constituents to be analyzed. The containers will have tight, screw-type lids with Teflon cap liners for glass bottles.

Containers are purchased, precleaned according to EPA protocols from the supplier, and kept under strict chain of custody to preserve the integrity of

---

\*Teflon is a registered Trademark of E.I. duPont de Nemours and Company.

the containers and samples from collection through disposal in accordance with WHC-CM-7-7, EII 5.2, "Soil and Sediment Sampling".

#### E-6.4.2 Sample Labels

Labels will be attached to each sample to prevent misidentification. They may be stick-on paper labels or tags and will be affixed to the proper sample containers prior to, or at the time of collection. All information will be filled out at the time of collection.

Nonsmearable pencil or ink will be used, but samples may be double bagged with the label in the outer bag. Each label will contain at least the following information:

- Site contractor
- Project/task name
- Collector's name
- Date and time collected
- Sample number.

#### E-6.4.3 Sample Container Seals

Sample container seals will be used to prevent and/or detect tampering; i.e., following collection until laboratory analyses. Seals will be applied to the sample containers before leaving the sample location. The seals will be attached so that the seal will be broken by opening the container.

#### E-6.4.4 Sample Analysis Request Form

The sample analysis request form as documented in WHC-CM-7-7, EII 5.2, "Soil and Sediment Sampling" has been designed to accompany the samples to the laboratory and designate the analyses to be performed on each sample. The form also provides the sampling supervisor's with documentation to ensure that all samples have been received and that correlation between sample analysis and sample numbers is finalized and completed. The minimal information on this form includes the following:

- Contractor
- Company contact
- Project/task name
- Sample number
- Sample type
- Analysis requested
- Data and time collected
- Laboratory sample custodian.

#### 1 E-6.4.5 Storage of Samples

2  
3 Once the samples have been collected, various steps may be required to  
4 preserve the chemical and physical integrity of the samples as documented in  
5 WHC-CM-7-7, EII 5.2, "Soil and Sediment Sampling". The method of sample  
6 preservation may vary according to sample type and parameter to be analyzed.  
7 Preservation and storage requirements will be followed based on the specific  
8 analytical methods to be used.  
9

10 Regardless of the type of sample, all samples will be placed in an ice  
11 chest and cooled to 4°C (40°F) as soon as possible after collection.  
12

13 Samples collected from radiation zones (i.e., the 618-1 Burial Ground)  
14 will be checked by a health physics technician prior to transportation from  
15 the site.  
16

#### 18 E-6.4.6 Chain of Custody Record

19  
20 To ensure the integrity of the samples from collection, through analyses,  
21 to final disposition; documentation in accordance with WHC-CM-7-7, EII 5.1,  
22 "Chain of Custody", is necessary to trace possession and routing. This  
23 documentation generally takes the form of a record providing a history of  
24 persons having custody of the sample to include situations where the sample is  
25 subject to the following:  
26

- 27 • In a person's physical possession
- 28 • In view of a person
- 29 • Secured by individual so tampering is impossible.  
30

31 A chain of custody record will be filled out and accompany all samples  
32 from collection to analysis. Multiple copies will be required and at least  
33 one copy must be maintained by the sampling supervisor. The following  
34 information should be included:  
35

- 36 • Contractor
- 37 • Project/task name
- 38 • Sample numbers
- 39 • Date and time collected
- 40 • Sample type
- 41 • Number of containers
- 42 • Collector's signature
- 43 • Signature of person receiving possession
- 44 • Inclusive dates of possession
- 45 • Condition of samples upon receipt.  
46

#### 48 E-6.4.7 Disposal Procedures

49  
50 Excess sample material left over from filling of sample containers will  
51 be returned to the approximate site of origin. The sampling location will be  
52 hand graded to minimize potential precipitation infiltration and/or  
53 contaminant migration.

Nothing transported to the site will be disposed of onsite. Articles such as protective clothing that have been soiled with potentially contaminated materials will be temporarily placed in plastic-lined containers and managed by the sampling personnel. These containers will be stored in a designated area at the direction of the sampling personnel until the contents have been tested for dangerous wastes. If the contaminants are found to be dangerous, arrangements will be made for proper disposal. If they are discovered to be nondangerous, materials will be laundered or disposed of according to onsite procedures. Containers for temporary storage will be properly marked as potentially dangerous waste until the analyses are known.

## E-7 RADIOLOGICAL CONTAMINATION CONTROL

Because sampling is to be undertaken within a radiological controlled area, appropriate radiation procedures (radiation work procedures) will be followed. If radioactive/dangerous waste is detected during physical sampling, the following activities in accordance with WHC-CM-7-7, EII 5.5, "Decontamination of Equipment for RCRA/CERCLA Sampling" will occur.

### E-7.1 PERSONNEL DECONTAMINATION PROCEDURES

A decontamination area will be established near the control station and upwind of sampling activity whenever possible. In accordance with the *Health and Safety Plan* (WHC-CM-7-7, EII 2.1), Westinghouse Hanford Company's (internal use only) *Radiation Work Permit*, and WHC-CM-7-7, EII 5.4, "Decontamination of Drilling Equipment", personnel will be radiation surveyed before being allowed to leave the controlled work area.

### E-7.2 MODIFICATION TO PERSONNEL DECONTAMINATION PROCEDURES

All modifications to decontamination procedures will be approved by the field team leader and the site safety officer. Modifications will be recorded in the appropriate logbooks.

### E-7.3 EQUIPMENT DECONTAMINATION

Care will be taken in field sampling to ensure that there is no cross contamination of samples by sampling equipment. To prevent this source of contamination, freshly cleaned and decontaminated sampling tools will be used. When equipment must be reused in the field, it will be cleaned as thoroughly as practical. For this purpose, stringent laboratory cleaning procedures have been modified for field conditions as documented in WHC-CM-7-7, EII 5.5, "Decontamination of Equipment for RCRA/CERCLA Sampling".

## E-8 FIELD QUALITY ASSURANCE/QUALITY CONTROL

When finalized, sampling procedures will be consistent with EPA (SW-846) protocols. Quality control samples for the soil and concrete will be



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collected in accordance with SW-846 guidelines, where applicable. Nomenclature and definition of terms will be consistent with those identified in SW-846. Field quality control samples will include duplicates, field blanks, equipment blanks, and trip blanks. At a minimum, 1 sample in 20 (5 percent) will be divided in the field, appropriately labeled, and treated as a duplicate. In the event that the sampling rate is less than 20 samples per week, or 20 per sampling effort, at least one duplicate sample will be collected per week, or per sampling effort, whichever is greater. All samples will be submitted to the same analytical laboratory. The quality assurance/quality control samples for both soil and concrete will be handled similarly.

At least one field blank will be collected for each sampling medium (e.g., soil and concrete). Field blanks will consist of aliquots of analyte-free water or solvents brought to the field in sealed containers, opened for typical sampling time, closed, properly labeled, resealed, and transported to the analytical laboratory with the other field samples. Trip blanks will be identical to field blanks, but are not opened in the field. At least one trip blank will accompany samples transported from the field to the analytical laboratory.

Equipment blanks (post-decontamination rinsate samples) will consist of field blank samples (i.e., analyte-free deionized water) opened in the field and the contents poured appropriately over or through the sample collection equipment after decontamination. At least one representative equipment blank will be collected for each sampling medium.

#### E-8.1 PERSONNEL TRAINING

Several training courses has been specified for soil sampling personnel. The required courses and activities are documented in WHC-CM-7-7, EII 1.7, "Indoctrination, Training, and Qualification" as follows:

- *Occupational Safety and Health Administration* (OSHA 1989) approved, 40-hour, Dangerous Waste Worker Training or Hanford-approved, 24-hour, basic waste site health and safety training
- Cascade and escape pack training (Hanford)
- Self-contained breathing apparatus training (Hanford)
- Radiation worker training (Hanford)
- A 3 day on-the-job training session under the supervision of an experienced person before full responsibility of the particular job may be assumed
- First aid training is desirable, but not mandatory, for work on the Hanford Site
- All personnel at the dangerous waste site will be required to have reviewed the sampling and analysis plan (this document).

## E-8.2 STANDARD SAFETY PROCEDURES

In addition to the soil sampling requirements of SW-846, the following procedures will apply each time personnel make a site entry for soil sampling purposes.

- No personnel will be at the site without a designated 'buddy'.
- One of the persons entering the site will be designated to be in charge by the Health and Safety Plan.
- Personal protective equipment will be worn as specified. Approved deviations will be entered in the field logbook and signed by the field team leader and the site safety officer.
- Field work will be planned prior to site entry.
- Equipment needed for work will be inventoried and inspected prior to the site visit to ensure that all equipment is present and in operable condition.

## E-8.3 HEALTH AND SAFETY PLAN

A Health and Safety Plan is required for all dangerous waste sampling sites. The plan is intended to specify information pertinent to field assignments and to be a guide in times of an unusual situation or emergency. The Health and Safety Plan is not intended to be an exhaustive encyclopedia covering every conceivable situation or question. The field team leader will always be present during site visits, and will be trained and experienced with the authority to make field decisions deviating from soil sampling procedures. During sampling activities, the site safety officer will be present or immediately available and will have authority to make decisions regarding safety issues. Telephone numbers also will be provided if further assistance is required. A reviewed and approved Health and Safety Plan will be developed and completed before initiation of soil sampling in accordance with WHC-CM-7-7, EII 2.1, "Preparation of Health and Safety Plans". All deviations from the approved Health and Safety Plan must be documented in the field logbook by the field team leader and later initialed by the site safety officer.

## E-9 LABORATORY PROCEDURES, QUALITY ASSURANCE, AND QUALITY CONTROL

The following sections provide information on laboratory procedures, quality assurance, and quality control.

1 E-9.1 LABORATORY RECEIPT AND LOGGING  
2 OF SAMPLE  
3

4 A sample custodian will receive the samples in the laboratory. Upon  
5 receipt of a sample, the custodian will, as documented in WHC-CM-7-7, EII 5.1,  
6 "Chain of Custody", inspect the condition of the sample and the sample seal;  
7 verify the information on the sample label and seal against that on the chain  
8 of custody record; assign a laboratory number; log in the sample in the  
9 laboratory logbook; store the sample in a secured sample storage room or  
10 cabinet; and report missing or damaged samples.  
11

12  
13 E-9.2 ANALYTICAL PROCEDURES  
14

15 Analyses will be performed by the laboratory in accordance with EPA  
16 requirements. Whenever available, SW-846 methods will be used. Where  
17 appropriate, other sample preparation and analytical methods will be employed  
18 upon approval from Ecology.  
19

20  
21 E-9.3 LABORATORY QUALITY ASSURANCE AND  
22 QUALITY CONTROL  
23

24 The laboratory will ensure the integrity and validity of test results  
25 through implementation of an internal quality control program. The program  
26 will meet the quality control criteria of EPA guidelines and, as applicable,  
27 SW-846, and *The Handbook for Analytical QC in Water and Waste Water*  
28 *Laboratories*, third edition of EPA-600/4-79-019 (EPA 1979). A system of  
29 reviewing and analyzing the results of these samples will be maintained to  
30 detect problems due to contamination, inadequate calibrations, calculations,  
31 procedures, or other causes. Standard methods will be used and alternative  
32 methods that are developed or adapted will be tested and completely  
33 documented. All methods and method changes will be approved by the  
34 Westinghouse Hanford Company contracts representative.  
35

36 The quality control procedures for laboratory analyses will include  
37 evaluation of blanks, matrix spikes, surrogates, and other quality control  
38 samples as appropriate for determination of the quality assurance/quality  
39 control (QA/QC) for each matrix and analytical method. Quality control  
40 procedures for individual methods will be documented in the laboratory's  
41 analytical procedures.  
42

43 All analytical methods will be in compliance with minimum quality control  
44 criteria of standard EPA methods, where such criteria exist (EPA 1986). The  
45 analytical laboratory will have obtained the Westinghouse Hanford Company  
46 approval on all methods prior to the analysis of samples.  
47

48 The EPA guidelines for the determination and reporting of accuracy,  
49 precision, and detection limits of the analytical methods will be met. The  
50 analytical laboratory will provide tabulated information representative of  
51 accuracy, precision, and detection limits for at least the three month period  
52 over which the analyses were performed. Laboratory quality assurance/quality  
53 control information will be required on representative constituents for each

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1 of the analytical methods used, e.g., those evaluated for the EPA contract  
2 laboratory program (CLP), for a soil matrix. Accuracy and precision will be  
3 determined for, and representative of, the mid-range of the standard working  
4 range used for the analysis. Information on accuracy and precision can be  
5 determined from the matrix spike and/or surrogate spike recoveries of standard  
6 reference samples or EPA control samples, if appropriate. Accuracy and  
7 precision will be reported in a manner similar to that indicated in SW-846  
8 (6010-16). The upper and lower limits of the standard working range used for  
9 the analysis will be reported in a form comparable to Form XIII (SW-846;  
10 ONE-32).

11  
12 Representative lower limits of detection will not exceed the EPA  
13 requirements for detection limits. Detection limits will be reported as one  
14 of the following: (1) the lower limit of the standard (linear) working range  
15 used for the analysis, (2) the low concentration standard used in the  
16 calibration provided that this concentration does not exceed EPA requirements,  
17 or (3) the detection limits and/or quantitation limits for each analyte  
18 calculated from measured standard deviation of the average background noise  
19 level using the criteria outlined in SW-846 (ONE-15; THREE-2), for either the  
20 interpolated background beneath analyte peaks in the low-concentration  
21 calibration standards, or at the peak spectral positions in a reagent blank.  
22 The analytical laboratory will specify the definition of lower limit of  
23 detection used. Detection limits will be regarded as the lower limits of  
24 reportable concentrations of an analyte. Concentrations less than these  
25 limits will be reported as less than detection limits (e.g., <1.0 mg/kg).  
26 Representative precision at the detection limits also will be determined and  
27 reported in a similar manner as the precision for the mid-range. Precision at  
28 the lower limit of detection, as defined above, will be determined from the  
29 replicate analyte peak measurements for the low-concentration calibration  
30 standards or for the samples used in establishing the lower limit of  
31 detection. Representative detection limits and associated precision on the  
32 lower limit of detection and precision at this limit, will be reported for  
33 each analyte in a form comparable to FORM VIII (SW-846; ONE-25).

34  
35 A duplicate and a blank sample will be processed with each sample batch  
36 or after every 20 samples, whichever is more frequent. Quality control  
37 samples prepared in the same matrix and in the same manner as a mixed  
38 calibration standards, at 10 times the instrument detection limits or in the  
39 mid-range of the working standard calibration, will be analyzed after every  
40 10 samples (e.g., SW-846, 6010-9,10; 7000-10). Spike recovery will be  
41 calculated by the method detailed in ASTM Method D 3856, Section 11.5.4,  
42 Annual Book of ASTM Standards, Volume 11.01 (1986). Analytical data on  
43 blanks, duplicates, and control samples will be reported in the same manner as  
44 samples. Care will be taken to ensure that duplicate samples are  
45 representative of the original sample.

#### 46 47 48 E-9.4 DATA REPORTING 49

50 After completion of the sampling effort, verification documents will be  
51 provided for actual sample locations, numbers of samples, and specific methods  
52 used for collection as documented in WHC-CM-7-7, EII 6.1, "Activity Reports of  
53 Field Operations". Data received from the laboratory will be reviewed,

analyzed, and summarized statistically. Reporting the results of the Soil and Concrete Sampling and Analysis Plan will be in accordance with applicable RCRA regulations.

#### E-9.5 SAMPLE DISPOSITION

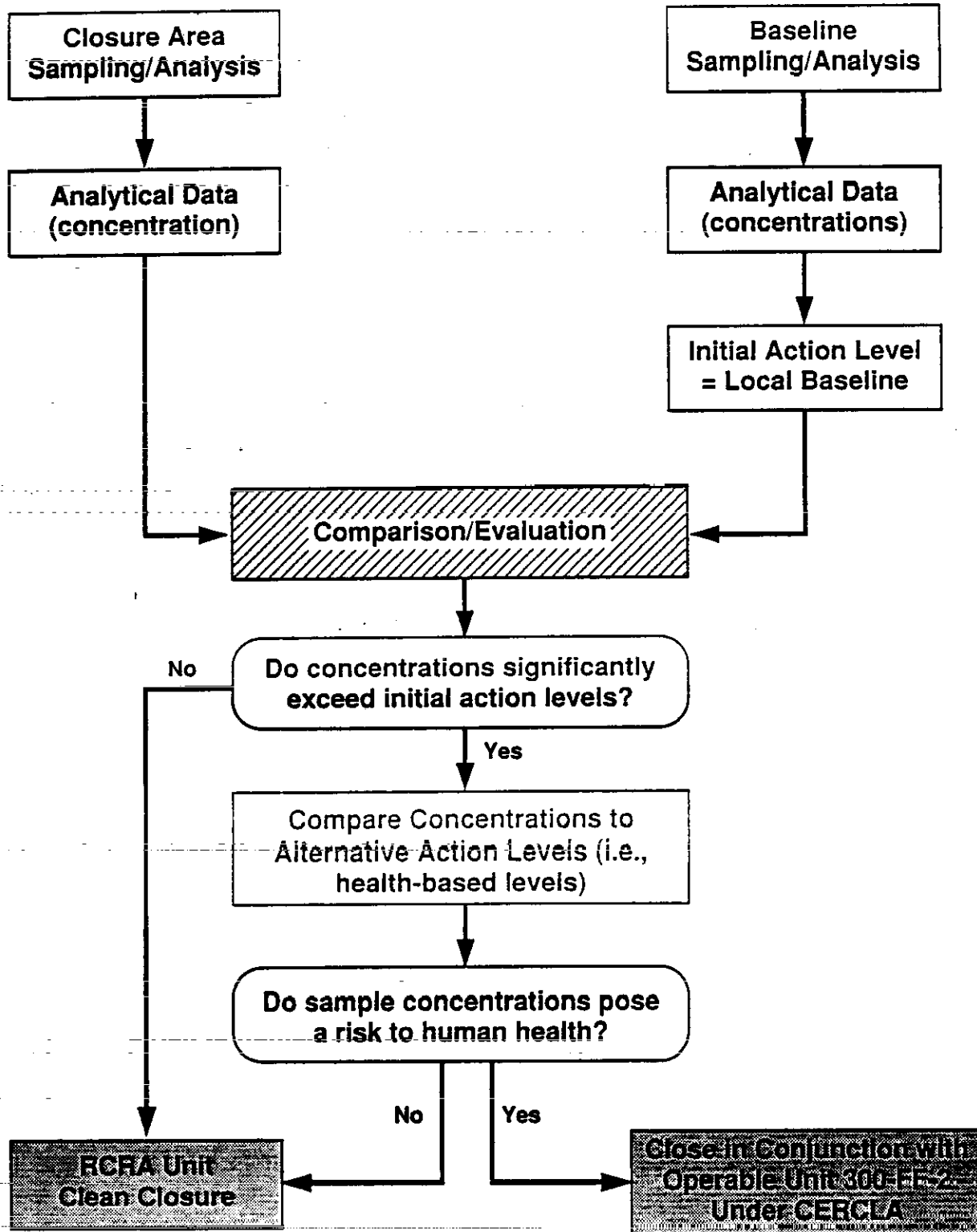
After all analyses have been completed as specified, reports will be reviewed for anomalous data. Requests for reanalysis or data checks will be made as soon as possible. At the certified completion of all analyses, the samples will be either returned to the collector, properly disposed of, or archived by the laboratory, if requested. In no case will the samples be held longer than 3 years, unless specifically designated.

#### E-10 INTERPRETATIONS AND STATISTICAL TREATMENT OF DATA

All data collected will be analyzed and tabulated for evaluation using the methods described in SW-846 and other guidance documents and statistical references, where applicable (e.g., Barth and Mason 1984; EPA 1986a). Laboratory data will be provided to Ecology upon completion of sampling and analysis. Data for individual constituents will be summarized and will include the following information:

- Number of 'less than' (LT) detection limit values
- Detection limit value
- Total number of values
- Mean values
- Standard deviation
- Coefficient of variation
- Minimum value
- Maximum value
- Representative uncertainties (precision).

The data will be interpreted by qualified scientists and statisticians. The technical basis for establishing the baseline threshold concentrations, the methods by which significant deviation from baseline will be determined are being developed by Westinghouse Hanford Company and the U.S. Department of Energy-Richland Operations Office for the Hanford Site (WHC 1989). The use of background data in evaluating closure of the 300 ASE will involve the comparison of individual sample concentrations to a background threshold using a Tolerance Interval-type approach to the analysis (e.g., EPA 1989c). This type of comparison defines an upper concentration limit (i.e., threshold) beyond which a sample will be suspected to be contaminated. The baseline concentrations for each constituent of interest in the 300 ASE soil will be based on statistical methods frequency distribution methods (e.g., EPA 1989c; WHC 1989), or other appropriate techniques. Data evaluation will be based on statistical criteria and professional judgment, where appropriate. The decision tree for the evaluation of the compositions of soil and concrete verification samples is illustrated in Figure E-8.



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Figure E-8. Decision Tree for Soil and Concrete Verification Samples.  
(79001152.2)

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APPENDIX F

AIR QUALITY MONITORING RECORDS AT THE  
300 AREA SOLVENT EVAPORATOR

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CONTENTS

1		
2		
3		
4	Letter - Ambient Solvent Concentrations Near the 333 Building Waste	
5	Solvent Evaporator Bin (Issued October 17, 1979)	1 Page
6		
7	Letter - Waste Solvent Evaporator Vapors - 333 Building (Issued	
8	August 1, 1984)	1 Page

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HANFORD ENVIRONMENTAL  
HEALTH FOUNDATION

Dist: B. D. Breitenstein, M.D.  
B. D. Reinert

October 17, 1979

CO 5220

UNC Nuclear Industries  
1109-N Building, 100-N Area

Attn: E. M. Greager

AMBIENT SOLVENT CONCENTRATIONS NEAR THE 333 BUILDING WASTE SOLVENT EVAPORATION BIN

On September 11, 1979, ambient air sampling for organic solvent vapors was conducted at the waste solvent evaporation bin located outdoors east of the 333 Building. The bin is essentially an open metal industrial refuse bin fitted with a rain canopy that receives organic solvent wastes from the 333 Fuels Building. Purpose of the sampling was to determine what, if any, effect this evaporation facility has on surrounding ambient air quality.

Past degreasing operations in the 333 Building have utilized trichloroethylene as the degreasing solvent. Trichloroethylene has since been phased out and replaced with perchloroethylene. Sampling was performed for both solvent vapors at two locations, one approximately 4 feet above ground level and 6 feet south of the bin, the other approximately 3 ft. above ground level and 45 feet south of the bin. Samples were collected over a 90-minute sampling duration (12:30 pm-2:00 pm) by drawing air through charcoal tubes using precalibrated portable sampling pumps. Weather conditions were warm and sunny, with air temperatures in the upper 70's to mid-80's and a gentle breeze from north to south.

Samples were analyzed by gas chromatography. As expected, no trichloroethylene vapors were detected at either sampling location. Perchloroethylene vapors were detected only at the location nearest the bin and then at the very low concentration of 0.07 ppm. Although no ambient air standard exists for perchloroethylene vapors, the prescribed DOE occupational exposure limit\* would allow an 8-hour time-weighted average exposure of 100 ppm to which it is considered nearly all workers could be exposed for a normal 8-hour workday or 40-hour workweek, day after day, without adverse effect.

The concentration of perchloroethylene measured is insignificant both due to its low magnitude and physical remoteness from workers. No detrimental air quality effects are indicated. If you have any further questions, please contact Environmental Health Sciences.

*L. J. Maas*

L. J. Maas  
Environmental Health Sciences

mg

1/ ACGIH Threshold Limit Values, 1979.



HANFORD ENVIRONMENTAL  
HEALTH FOUNDATION

August 1, 1984

CO 8734

UNC Nuclear Industries  
3707-D Bldg.  
300 Area

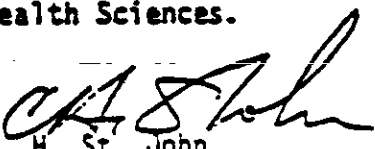
Attn: Barry Vedder

WASTE SOLVENT EVAPORATION VAPORS - 333 BUILDING

This will document the results of two air samples collected<sup>1</sup> July 18, 1984, to measure methyl chloroform (1,1,1, trichloroethane) and perchloroethylene vapor concentrations at and near the 333 Building outdoor waste solvent evaporator. Both samples were collected down wind of the evaporator, one 2.5 ft. from the evaporator opening, the other 13 ft. from the opening. The ambient air temperature at the time of sampling was approximately 90 °F.

The sample results indicate that vapor concentrations were less than 1 ppm for each solvent at both sample locations.

Should you have any questions regarding these results, please contact Environmental Health Sciences.

  
C. H. St. John  
Environmental Health Sciences

hk

<sup>1</sup>By use of pre-calibrated battery operated pumps and charcoal sorption tubes.

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 C. E. Finley

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 Seattle  
 Seattle

ONSITE

2 U.S. Department of Energy,  
Richland Field Office

J. D. Bauer  
 C. E. Clark

A5-15  
 A5-15

19 Westinghouse Hanford Company

S. B. Clifford  
 R. G. Gant  
 E. M. Greager  
 C. B. Hays  
 J. D. Hoover  
 R. E. Lerch  
 M. M. Owens  
 S. M. Price  
 W. H. Price  
 F. A. Ruck III  
 W. A. Skelly  
 B. L. Vedder  
 D. J. Watson  
 E. A. Weakley  
 EDMC (2)

H4-57  
 L6-18  
 L6-60  
 L4-97  
 H4-57  
 B2-35  
 H4-17  
 H4-57  
 N3-05  
 H4-57  
 H4-55  
 B2-19  
 X0-41  
 L6-28  
 H4-55  
 H4-17

Information Release Administration (3)

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# CONTINUATION NOTICE

**RECORD NO: 0037961 PART 16 of 18**

This record has been filmed in two parts.  
to view the remaining portion of this  
record, see the microfilm reel and frame  
number listed below.

**CONTINUES ON:**

**REEL NO: 94-13293 PART II**

**FRAME NO: 2148**

**END OF PART 1**

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